

FAA-E-2734(B)
March 1990

SYSTEM SPECIFICATION (REQUIREMENTS)
FOR THE
REMOTE MAINTENANCE MONITORING SYSTEM (RMMS)
MAINTENANCE MANAGEMENT SYSTEM



DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
SPECIFICATION

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The authors wish to express their sincere thanks to the Federal Aviation Administration (FAA) personnel who contributed insight and information relating to the Maintenance Management System (MMS) and FAA operations.

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FOREWORD

This document represents the second formal revision of the Maintenance Management System - System Specification (Requirements). It incorporates changes that are related to Phase 1 and portions of Phase 2 of MMS. Future revisions will address changes that are related to other Phase 2 requirements of MMS.

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1. INTRODUCTION

This section briefly describes the background and purpose of the Maintenance Management System (Section 1.1), and defines the scope of this Requirements Specification (Section 1.2).

1.1 BACKGROUND/PURPOSE

The Federal Aviation Administration (FAA) is currently developing the Maintenance Management System (MMS) to facilitate the management of maintenance activities that are under the responsibility of the Associate Administrator for Airway Facilities (AAF). MMS is a component of the Remote Maintenance Monitoring System (RMMS) and is central to the agency's plans for modernizing maintenance operations. The MMS will provide automated information support to Airway Facilities (AF) maintenance specialists and managers in the performance of their duties. This automated support will be provided at local facilities where specialists normally are stationed, as well as at remote, normally unattended facilities where specialists visit to perform maintenance tasks. This support will provide for the collection, storage, and access to facility and maintenance data at maintenance sectors, work centers, regional offices and select FAA support and headquarters organizations by authorized personnel. MMS compliments the other major component of RMMS, the Monitor and Control Software (MCS), which allows authorized maintenance specialists to perform real time monitoring, control and certification of both local and remote facilities.

MMS is oriented towards providing capabilities in support of performance reporting and trend analysis. The system also supports data exchange between MMS and other related FAA management information systems either in existence or planned.

MMS will provide a unified, automated, technical and administrative support system to facilitate decision-making within AAF. It will provide timely exception reports on the status of the NAS to FAA management, allowing quick response to situations potentially affecting NAS safety or service to users. It will provide the data needed by all levels of AAF management to monitor and manage NAS facilities and services and to deal effectively with diminishing resources without jeopardizing the safety of the NAS.

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1.2 SCOPE

This document is the Maintenance Management System - System Specification (Requirements). It defines the functional, operational, and performance requirements for MMS. This specification will guide the development of the MMS. All sections of this requirements specification are subject to revision. All revisions require FAA System Engineering and Configuration Management Division (ASE-200) approval.

Section 2 of this specification lists applicable documents. Section 3 defines the MMS mission and describes the operation of MMS. Section 4 specifies the requirements for MMS, including functional, operational, and performance requirements. Standards applicable to the design and development of MMS are also specified. Section 5 presents Quality Assurance (QA) requirements.

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2. APPLICABLE DOCUMENTS

2.1 GOVERNMENT DOCUMENTS

2.1.1 Federal Aviation Administration

- (1) Quality Control Program Requirements, March 4, 1970.
(FAA-STD-013)
- (2) Quality Control System Requirements, August 27, 1975.
(FAA-STD-016)
- (3) Computer Software Quality Program Requirements, May 26, 1977. (FAA-STD-018)
- (4) Software Documentation Standards for Program Development, April 1975. (FAA SRDS-140-SDS-1)
- (5) Transmittal of the Maintenance Philosophy Steering Group (MPSG) Report, June 1979. (Order 6000.27)
- (6) 80's Maintenance Concept Implementation Plan, Book 1, April 1981.
- (7) System Implementation Plan - Remote Maintenance Monitoring System, December 1981. (Order 6140)
- (8) FAA Logistics and Inventory System, November 1982.
- (9) NAS Performance Reporting System. (Order 6040.15)
- (10) Facilities Master File, November 1984. (Order 6000.5B)
- (11) NAS Facilities Information System - Maintenance Management System (MMS) Program Plan, October 1984.
- (12) General Maintenance Handbook for Airway Facilities, August 1978. (Order 6000.15A)
- (13) Field Inventory Management and Replenishment Handbook, April 1980. (Order 4250.9A)
- (14) Test Equipment Management Handbook, November 1975.
(Order 6200.4B)
- (15) Configuration Management, August 1981. (FAA-STD-021)
- (16) National Airspace System Configuration Management, February 1985. (Order 1800.8E)

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2.1.2 Military

- (17) Specification Practices, October 30, 1968, Notice 1, February 1, 1969, Notice 2 (MU), May 18, 1972.
(MIL-STD-490)

2.2 REFERENCE DOCUMENTS

- (18) Design of Man-Computer Dialogues, J. Martin, Prentice Hall, 1973.
- (19) Engineering Analysis and Trade Studies for the Maintenance Management System, Computer Technology Associates, September 1983.
- (20) Maintenance Processor Subsystem Sizing Study, MITRE, January 1985. (MTR-84W199)

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3. MMS SYSTEM DEFINITION

This section describes the objectives of the MMS program (Section 3.1), the MMS system concept (Section 3.2), the environment in which MMS will operate (Section 3.3), the interaction of FAA management and maintenance personnel with MMS (Section 3.4), and the phased approach planned for development and deployment of MMS (Section 3.5).

3.1 MMS PROGRAM OBJECTIVES

Figure 3-1 illustrates the objectives of the MMS program and the relationships between them. These objectives are the basis for the MMS requirements presented in Section 4.

The overall objective of the MMS program is to improve the cost-effectiveness of maintenance of NAS services, facilities, and equipment, in support of the FAA's new maintenance concept. This objective has two components: improvement of maintenance effectiveness and containment of maintenance costs.

MMS will support improvement of maintenance effectiveness by providing timely and accurate information that facilitates decision-making within AAF. This information will include improved performance reports which will provide uniform reporting of service and facility interruptions and equipment failures. MMS will eliminate redundant reports (both manual and automated) generated by overlapping systems and procedures. This reporting capability will provide FAA management with the information needed to react to problems which are potential threats to the performance or effectiveness of the NAS. This capability also aids in decision-making regarding maintenance policies and procedures or the replacement of equipment.

The FAA will base this reporting capability on automated facility maintenance logs which will expedite the identification and extraction of reportable performance events, and on a comprehensive inventory of NAS services, facilities, and equipment.

The MMS Program will support containment of maintenance costs in two ways. First, the MMS will integrate many existing systems to eliminate redundancy and provide improved support for maintenance operations. MMS will incorporate the functions performed by current systems (e.g., the Maintenance Automation Reporting System (MARS), the National Airspace Performance Reporting System (NAPRS), and the Facilities Master File (FMF)) involved in management of maintenance activities or performance reporting. All systems incorporated into MMS will require close coordination between the OPI for the system and the MMS team for

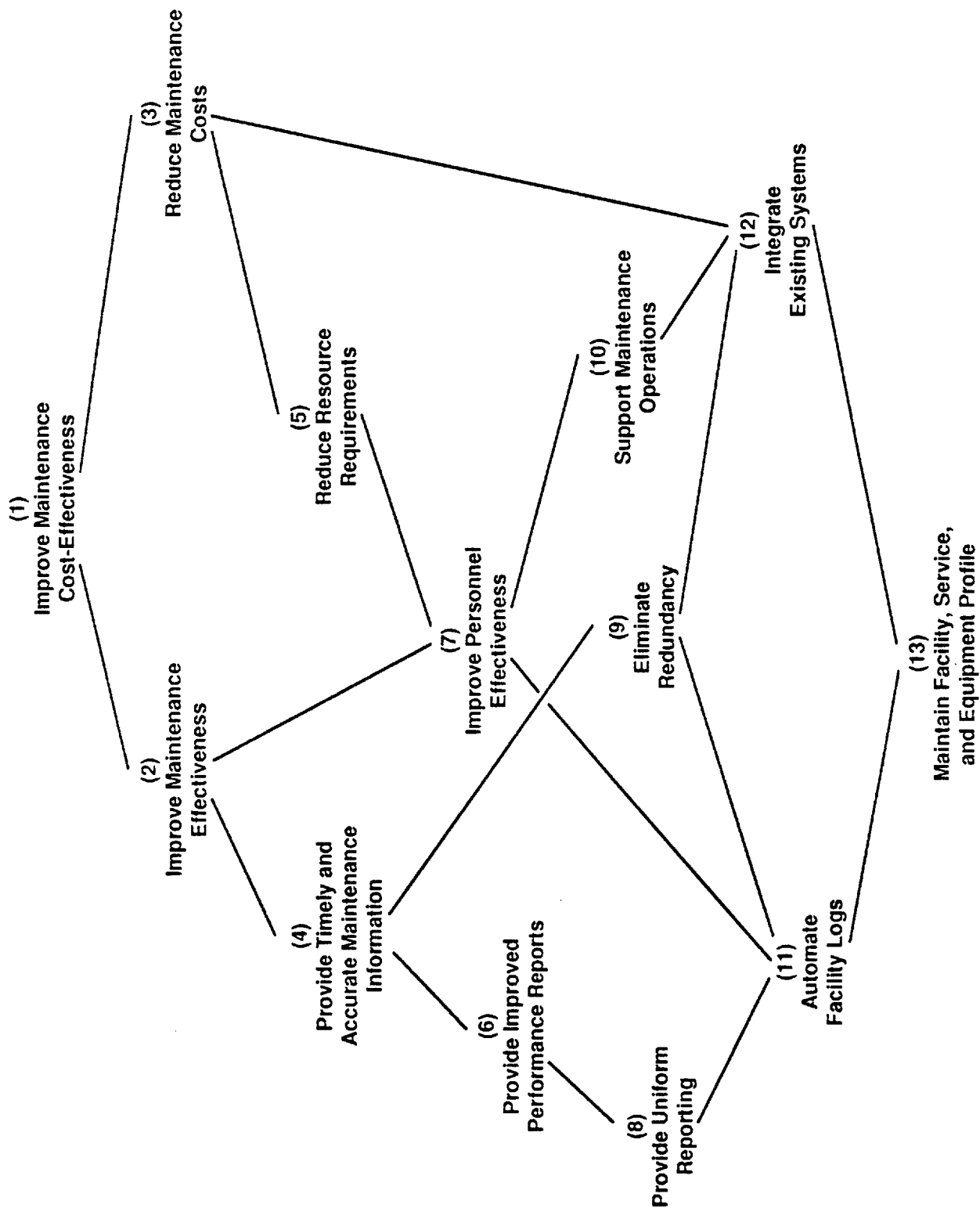


FIGURE 3-1. MMS PROGRAM OBJECTIVES

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necessary changes to existing documentation. Second, MMS will support improving the effectiveness of maintenance personnel. MMS will accomplish this by reducing the effort required to analyze facility maintenance logs and prepare performance reports. It will do this by providing improved support for maintenance operations such as maintenance scheduling and parts location and ordering and, indirectly, by changes in procedures, policies, and equipment engendered by analysis of the detailed, objective data supplied by MMS.

3.2 MMS SYSTEM CONCEPT

As components of the Remote Maintenance Monitoring System (RMMS), MMS and the Monitor and Control Software (MCS) will coexist on Maintenance Processor Subsystems (MPSS) located at 23 Air Route Traffic Control Centers (ARTCCs). MMS will also run on the MPS computer system at FAA Headquarters (ASM-240) in Washington, D.C., at the Aeronautical Center (ASM-600) in Oklahoma City, Oklahoma, and at the FAA Technical Center (ASM-450) in Atlantic City, New Jersey. The MPS computer system at FAA Headquarters serves as the MMS executive node. The MMS executive node is also referred to as the National MPS.

The MMS concept requires the distribution of the MMS database over these MPSSs. Data files that are national in scope will reside on the executive node. Data files that are local in scope will reside at the appropriate MPS sites. Sufficient data redundancy will exist to enable efficient and expeditious retrievals of data by all MMS users.

3.3 MMS INTERFACES AND USERS

This section describes the interfaces of existing and planned FAA systems with MMS. It also describes the interaction of FAA personnel with MMS. The MMS Context Diagram (Figure 3-2) portrays these interfaces and users. The MMS Interface Design Document (IDD) for the various systems will provide complete interface definitions.

3.3.1 National Airspace System Facilities Information System (NFIS)

(Deleted)

3.3.2 Telecommunications Management System (TELMS)

(Deleted)

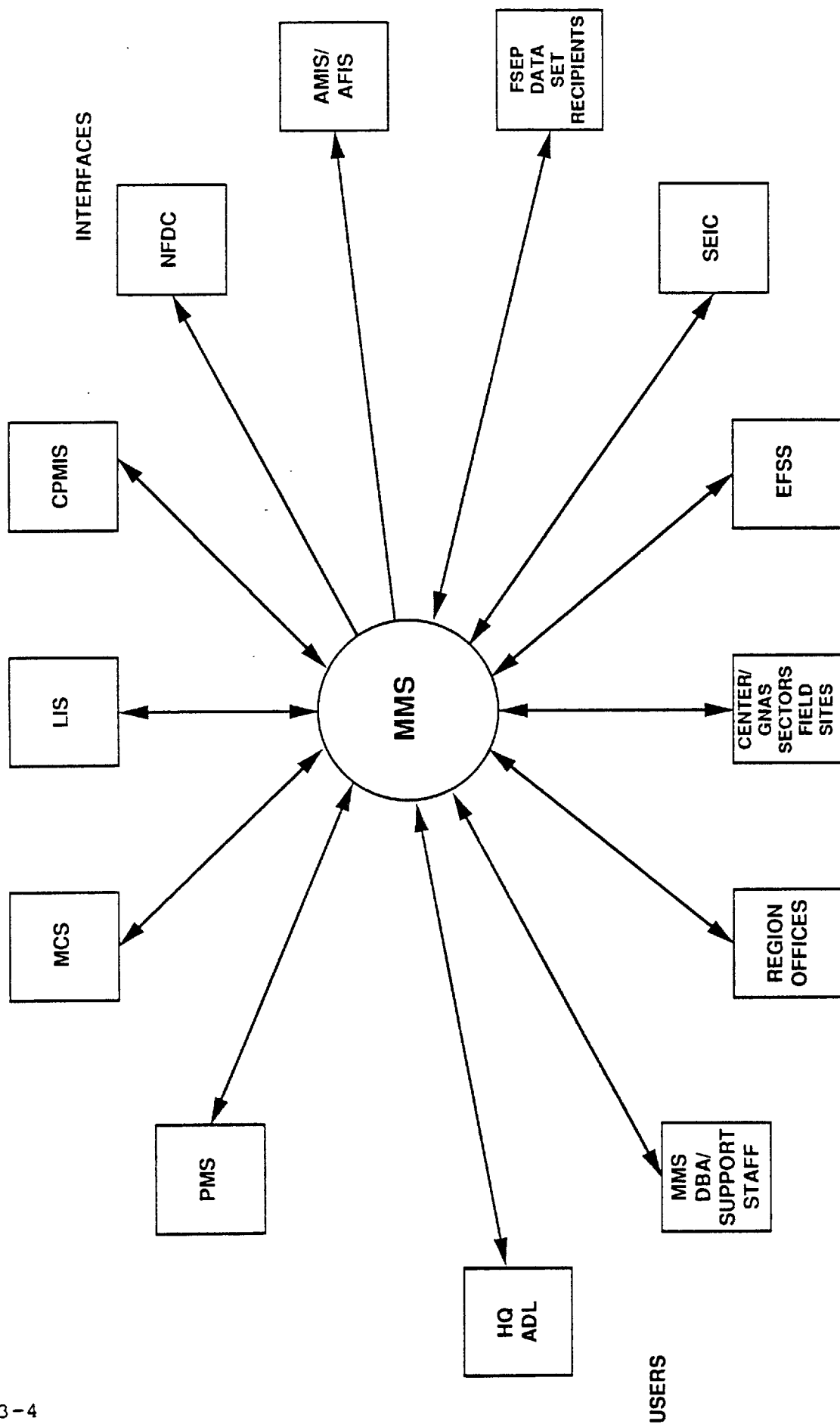


FIGURE 3-2. CONTEXT DIAGRAM FOR THE MAINTENANCE MANAGEMENT SYSTEM

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3.3.3 Program Management System (PMS)

PMS integrates a majority of FAA Headquarters (HQ)/NAS projects into a single database source system located at the Martin Marietta facility in Washington, D.C. PMS is accessible to all HQ offices via dedicated terminals, and to regions and centers via microcomputers. PMS receives FSEP extracts from MMS, which it requires to maintain the currency of its database. Via personal computer terminals, MMS users can review summary level PMS data related to the status and milestones of NAS projects. MMS transmits data to PMS concerning Electronic Equipment Modifications (EEMs).

3.3.4 Monitor and Control Software (MCS)

MCS provides the hardware and software required to monitor NAS equipment remotely. MCS automatically sends an alarm to the appropriate MPS terminals when the values of monitored parameters go beyond established limits. When requested by a user, MMS uses data received from MCS to create facility maintenance log entries. This includes data pertaining to alarm conditions, to facility or equipment configuration or status changes accomplished via remote command, and to remotely-performed diagnostics.

3.3.5 Logistics and Inventory System (LIS)

The MMS interface to the FAA Depot in Oklahoma City, Oklahoma, is through LIS. The purpose of this interface is to provide FAA personnel with a mechanism for ordering required parts and materiel from the Depot. The interface to LIS will support routine requisitions for spare parts, exchange-and-repair (E&R) items, and repair-and-return (R&R) items. It will also support priority requisitions and requisition status information.

3.3.6 Consolidated Personnel Management Information System (CPMIS)

MMS receives data from CPMIS which pertains to personnel who are responsible for the maintenance of NAS facilities and equipment. This data will be used to determine the availability in a specific region or sector of specialists that are certified to perform maintenance on a particular type of equipment. Identified inadequacies could then be resolved.

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3.3.7 Personal Property In-Use Management System (PPIMS)

MMS transmits data to PPIMS which identifies test equipment that is added to or deleted from the NAS. This data will be used by PPIMS personnel to update their database of FAA in-use personal property.

3.3.8 National Flight Data Center (NFDC)

The NFDC receives notification of service and facility status changes (e.g., commissionings, decommissionings) from MMS. It requires this information so that it can generate new, modify existing, or eliminate obsolete Flight Information Publications (FLIPs) (e.g., approach plates, en route and terminal area charts).

3.3.9 Aircraft Management Information System (AMIS)/Automated Flight Inspection System (AFIS)

MMS receives flight inspection schedules from AMIS/AFIS. The results of flight inspections are entered into the MMS database via the facility maintenance log. AMIS/AFIS users query MMS via MMS terminals for reports regarding the performance and outcome of both scheduled and unscheduled flight inspections.

3.3.10 Uniform Accounting System (UAS)

(Deleted)

3.3.11 Apollo

(Deleted)

3.3.12 Headquarters (HQ) - Associate Administrator for Airway Facilities (AAF)

HQ-AAF users query MMS for standard and ad hoc reports as required. Their primary requirements from MMS are for facility and service interruption reports, equipment failure reports down to the Line Repairable Item (LRI) level, and FSEP data.

3.3.13 Headquarters - Air Traffic (AT)

(Deleted)

3.3.14 MMS National Database Administrator (DBA) and Support Staff

The MMS National DBA is responsible for the configuration control of the MMS database. Authorized sector personnel perform the actual ongoing maintenance of their respective databases, but only the National DBA is authorized to modify the logical or

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physical configuration of the MMS database. The National DBA will establish policy governing the assignment of user authorization codes. The National DBA queries MMS on the National MPS for standard and ad hoc reports as required.

MMS Support Staff consists of Information Management Program (ASM-240) analysts with a detailed knowledge of the MMS database and a thorough understanding of MMS applications. They respond to special requests by MMS users who require new or special reports, or who have questions regarding the use of MMS. They query the MMS database for standard and ad hoc reports as required to satisfy user requests.

3.3.15 Regional Offices

Regional Office users query regional MPSSs for standard and ad hoc reports as required. They also use MMS to review Hardware Discrepancy Reports (HDRs), Program Technical Reports (PTRs), and other items entered into the MMS database that require Regional Office evaluation. Subsequent to evaluation, they update the status fields of these items in the MMS database to indicate their disposition. Regional Office users review FSEP updates made by field personnel. MMS receives technical evaluation schedules and the results of technical evaluations from the regional offices.

3.3.16 Center Sectors, General National Airspace System Sectors, and Field Sites

Center sector, GNAS sector, and field site employees (e.g., maintenance specialists, maintenance supervisors, crew chiefs, system engineers (SEs), specialists-in-depth, and sector managers) exercise many of the capabilities of MMS on a daily basis. They enter the following data into MMS: facility maintenance log entries, PTRs, HDRs, NCPs, field stock updates, parts orders, schedule updates (e.g., periodic maintenance (PM) activity, certification), notifications of parts received, FSEP updates, and maintenance-related employee suggestions. They query MMS for standard and ad hoc reports as required. They receive configuration management reports, maintenance alerts, modification specifications and other problem-related documentation, and requisition status from MMS.

3.3.17 Engineering Field Support Sector (EFSS)

The EFSS is composed of the National Automation EFSS (APM-160) and the National Airway EFSS (ASM-150). ASM-160 is responsible for automated facility and equipment modifications, and receives PTRs and HDRs, from MMS which pertain to automated facilities and equipment. ASM-150 is responsible for non-automated facility and equipment modifications, and will receive

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FIGURE 3-3. RELATIONSHIP OF MMS TO RMMS AND NFIS

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hardware discrepancies for non-automated facilities and equipment from MMS.

The EFSS is responsible for the determination of solutions to problems affecting NAS services, facilities, and equipment. When a particular problem is resolved, the resolution is documented. EFSS personnel enter the information/documentation into MMS for subsequent dissemination to regional offices and the affected center sectors, GNAS sectors, and field sites. EFSS documentation presently includes Plant Equipment Modifications (PEMs), Configuration Control Decisions (CCDs), Site Technical Bulletins (STBs), and Site Program Bulletins (SPBs). Ultimately, software patches and software listings, handbook changes, new handbooks, FAA directives, and EEMs may accompany this documentation. EFSS personnel query MMS for standard and ad hoc reports that enable them to determine the disposition of specific modifications, thereby providing them with the capability to track modifications through the various stages of implementation. The EFSS also receives PTRs, HDRs, and NCPs from MMS. EFSS personnel evaluate each submission to determine its validity. EFSS personnel query MMS for standard and ad hoc reports that support the evaluation process. Subsequent to evaluation, EFSS personnel update the status of each submission in the MMS database to indicate its disposition. EFSS personnel notify users, via MMS, of the validity of their submissions and if they are duplicates or have a known solution. EFSS personnel also query MMS for trend analyses and interruption reports, which enable them to evaluate the performance of NAS services, facilities, and equipment.

3.3.18 System Engineering and Integration (SEI) Contractor

Martin Marietta is the SEI Contractor for the FAA. The SEI Contractor will run various FAA programs on an IBM 3083. Configuration management data will pass between the SEI Contractor and MMS. MMS will provide the SEI Contractor with the FSEP data sets that it requires to maintain the currency of its database.

3.3.19 Facility, Service, and Equipment Profile Data Set Recipients

MMS will incorporate the functionality of the systems that support the FMF, the Engine Generator file, and the Precommissioned Facilities File, and the data comprising these files. All recipients of national data sets and reports currently derived from these files will receive them from MMS. MMS will produce these data sets and reports.

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3.4 OPERATIONAL SCENARIOS

This section describes the operational character of MMS by presenting a collection of scenarios of the more significant activities for which FAA personnel will use the system. The purpose of these scenarios is to exemplify how MMS will function in the context of the FAA environment. The scenarios do not describe the detailed internal functioning of MMS or the procedures of the various FAA organizations. Neither is the intent to address all of the requirements of MMS, or all of the possible variations of the activities presented. The scenarios concentrate, rather, on the interface between MMS and FAA personnel by describing, as a quasi-chronological sequence, the interactions that take place in the course of some typical FAA operations.

Throughout these scenarios, the maintenance supervisor (MS) is identified as the interface between the specialist and the AT supervisor for coordination of service interruptions. At center sectors (ARTCCs), the SE generally performs this function. The nature of flight scheduling through centers requires coordination a day or two in advance to permit equipment maintenance scheduling changes. At hub and terminal airports, the MS coordinates maintenance schedules with AT. The maintenance specialist and the AT supervisor generally coordinate this activity at GNAS sectors. As previously noted, the scenarios are general in nature; the intent is to provide an overview rather than address all of the specifics of coordination between maintenance personnel and AT personnel at all FAA sites.

This section presents five scenarios. These are:

- o Facility Maintenance Log;
- o Periodic Maintenance and Facility/Equipment Certification;
- o Spare Parts Stock;
- o Performance Reporting; and
- o Equipment Modification.

Each of the five scenarios includes a data flow diagram. This diagram displays the information flow related to the activity described by the scenario. These diagrams are not intended to show any procedural sequence but simply represent the information paths involved. Typically in these diagrams, as in the text of the scenarios, the reference "FAA national offices" refers to FAA offices above the field level (e.g., Headquarters, the FAA Technical Center, and the Aeronautical Center).

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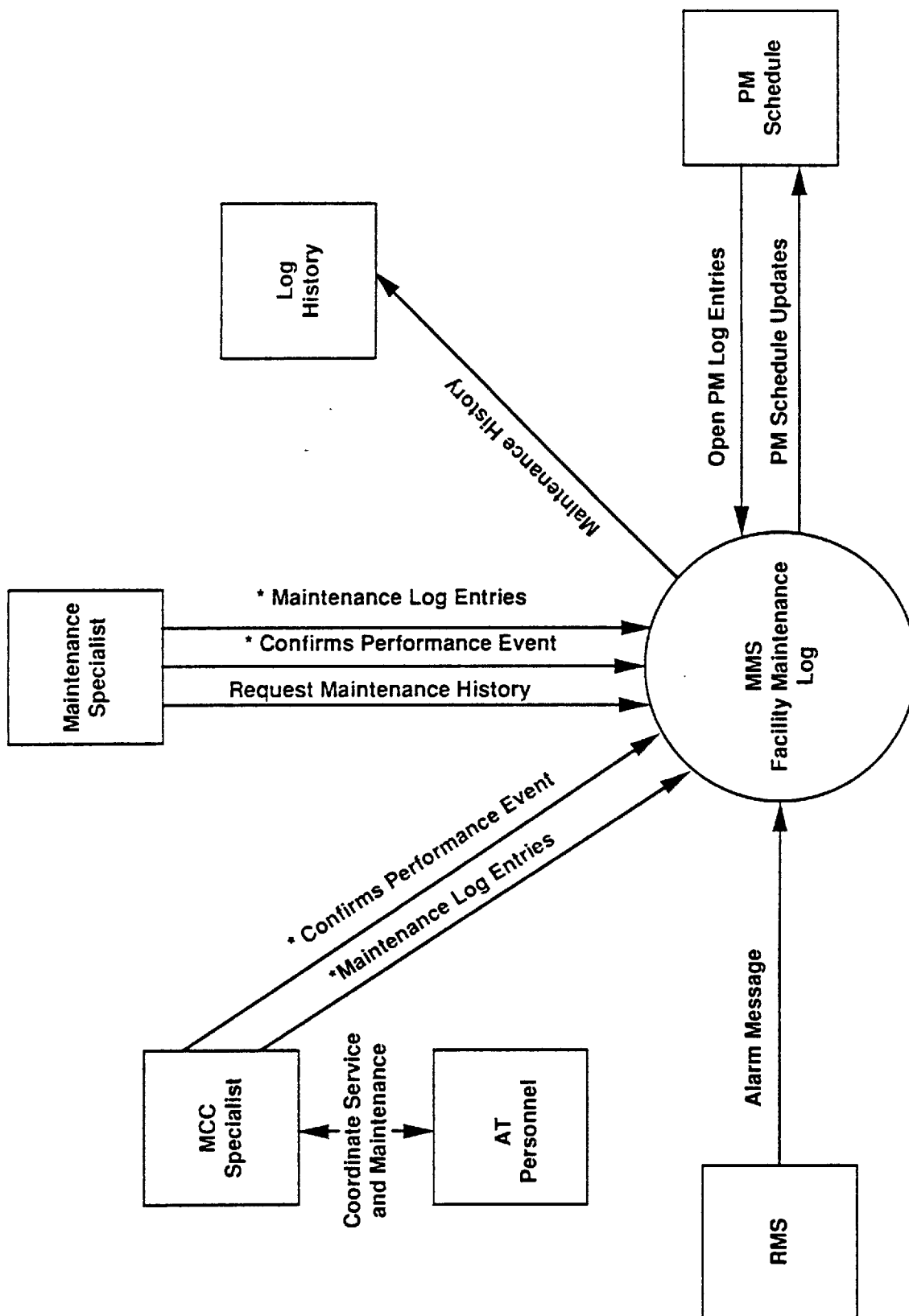
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This section describes how the maintenance specialist uses the MMS facility maintenance log. It also describes the information contained in the automated log and the way in which this information interfaces with other segments of MMS. Figure 3-4 represents these interfaces. The facility maintenance log is a chronological record of all maintenance activities associated with a facility. It contains real time information concerning equipment performance and maintenance activities that are fundamental to maintaining an interactive MMS.

The facility maintenance log is the primary source of information for MMS database updates. It provides a complete technical performance history as well as a complete maintenance activity and certification record for each facility. Examples of facility maintenance log entries include interruption entries, equipment failure entries, periodic maintenance entries, corrective maintenance entries, aircraft accident investigation entries, equipment interchange or replacement entries, and equipment modernization, modification, or repair entries.

The following presents a typical scenario involving the MMS facility maintenance log. This scenario begins with the Maintenance Control Center (MCC) receiving an alarm message from the Remote Monitor Subsystem (RMS), which indicates the failure of a local transmitter. Responding to the alarm, the MCC specialist uses an MMS terminal to log onto MMS. MMS responds with a menu. The MCC specialist requests the local callback roster. After having identified and notified the responsible maintenance specialist, the MCC specialist selects a facility maintenance log entry type from the menu. MMS then queries the MCC specialist for required information that was not supplied by the initial RMS alarm message (e.g., failure codes, comments). MMS checks the validity of all data entered into the facility maintenance log before accepting it into the system. Finally, MMS allows the MCC specialist to open a performance event. In this case, since a failure occurred, the MCC specialist makes the additional data entries required for the performance event.

Having been notified of the problem, the maintenance specialist proceeds to the localizer site and examines the equipment. The immediate cause of the failure is not apparent, so the specialist uses a portable MMS terminal, connected through dial-up lines, to log into MMS. He requests the previous month's facility maintenance log data for the localizer and notes that the localizer transmitter has malfunctioned frequently with no obvious failure indications. Knowing this, the specialist replaces the localizer transmitter and checks to see if the



* Appears more than once

FIGURE 3-4. MMS INFORMATION INTERFACES FOR FACILITY MAINTENANCE LOG ACTIVITY

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facility monitors properly. The specialist notifies the MCC specialist, who in turn notifies AT personnel in the control tower, that the problem has been corrected.

Having successfully performed the required maintenance, the specialist logs into MMS and initiates the facility maintenance log entry function. Again, MMS queries the field specialist for all required maintenance information including, but not limited to, the specialist's time of arrival at the site, the maintenance code (e.g., 80's for a failure or interruption, 60's for periodic maintenance), a brief description of the failure, the corrective action taken, the parts or equipment replaced, the time the facility was returned to service, and the field specialist's time of departure from the site. MMS allows this maintenance log entry to be associated with the open performance event for the localizer transmitter. Since the transmitter has been returned to normal service, the performance event entry is closed.

Another log interface is the PM schedule. The field maintenance specialist, having made the trip to the facility, decides to perform PM on the glide slope transmitter. He logs into MMS and selects the facility maintenance log entry function from the MMS menu. MMS displays, as open PM log entries, eligible tasks pertaining to the glide slope transmitter. The field specialist enters the appropriate data into MMS, including a "60" for the category code, indicating that the PM was accomplished. MMS uses the information from the facility maintenance log to update the PM accomplishment record.

3.4.2 Periodic Maintenance and Facility/Equipment Certification

This section describes a typical scenario of the use of MMS in the performance of periodic maintenance and facility/equipment certification activities, and demonstrates how the MS/SE, the specialist, the Air Traffic supervisor, the region office, and the FAA national offices interact with MMS. Figure 3-5 represents these interfaces.

The MS/SE may request a display of projected workload information (e.g. forecast of PM and facility/equipment certification schedules) from MMS. This allows him to assess personnel resource requirements for an extended period of time. He then directs MMS generation of the schedule of periodic maintenance activities. The MS/SE may, by entering various additional data, designate specific dates and specific personnel for each activity, providing a schedule that is tailored to the local situation. He can also change the automatically-scheduled next occurrence of PMs to accommodate local variations.

MMS users will identify items in the schedule that require coordination with Air Traffic. The MS/SE can review these items and, after coordination with the AT supervisor, can add or delete

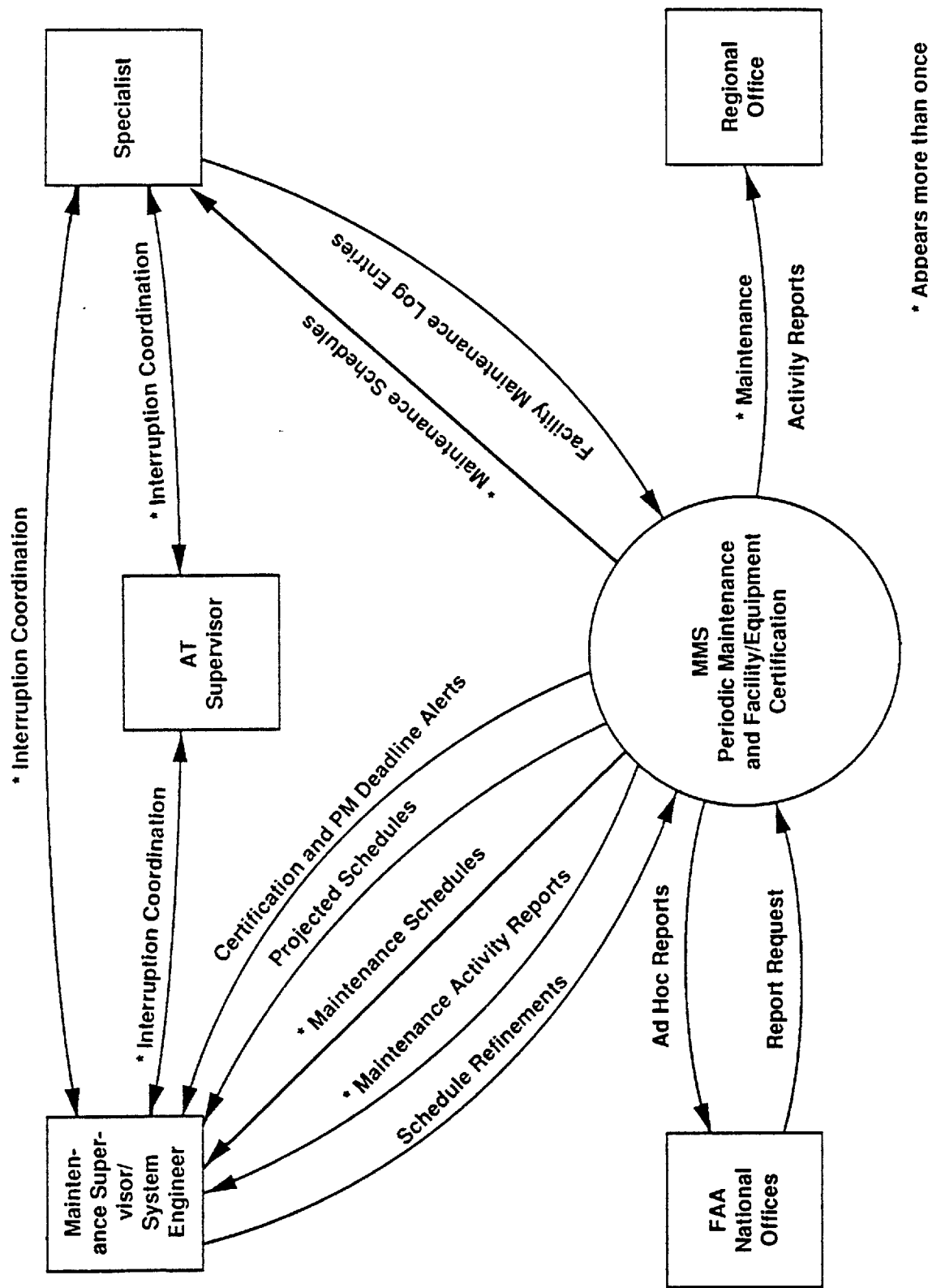


FIGURE 3-5. MMS INFORMATION INTERFACES FOR PERIODIC MAINTENANCE AND FACILITY/EQUIPMENT CERTIFICATION ACTIVITY

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as appropriate. The MS/SE reschedules any tentative task schedules requiring service interruptions that AT disapproved, and the process iterates as required.

MMS makes the final schedules available to the specialist who actually performs the maintenance, availability is either by display on an MMS terminal or by a hardcopy printout. Verbal coordination is generally required between the maintenance specialist/MS/SE and the AT supervisor just prior to the service interruption. The specialist enters a record of all his activities into MMS as updates to facility maintenance log entries.

MMS accepts the log entries and closes out all completed maintenance tasks recording pertinent details in a maintenance history. MMS verifies that the specialist is authorized to make facility or system certification log entries pertaining to the specific system, subsystem, or equipment that is the subject of the entry. MMS reports alert the MS/SE, advising him when a periodic maintenance or certification task is approaching its deadline. Any task not completed by its scheduled deadline appears in the maintenance history reports, indicating that the task was delinquent.

The MS/SE periodically requests maintenance activity reports from MMS. These reports provide detailed information regarding the performance of maintenance tasks. The system, as required by national policy on PM performance evaluation, generates additional reports presenting aggregate maintenance activity data at the sector and regional level.

3.4.3 Spare Parts Stock

MMS will provide an automated parts and materiel field stock control system for Depot supported and locally purchased spare parts. MMS will maintain location and balance information on selected parts as determined by the field sites.

This scenario describes the use of MMS for the location, ordering, and requisition status tracking of parts. It also describes the interactions between the specialist, the local ordering office, and the Depot. LIS, as described in Section 3.3.5 and as depicted in Figure 3-6, will serve as the interface to the Depot.

The specialist may use MMS to locate a specific part in the local field stock. If the part is not in the local field stock, the specialist may use MMS to determine if another location within the sector or region stocks the part.

Each time a specialist uses a spare part for which MMS maintains balances, he must enter a consumption transaction into

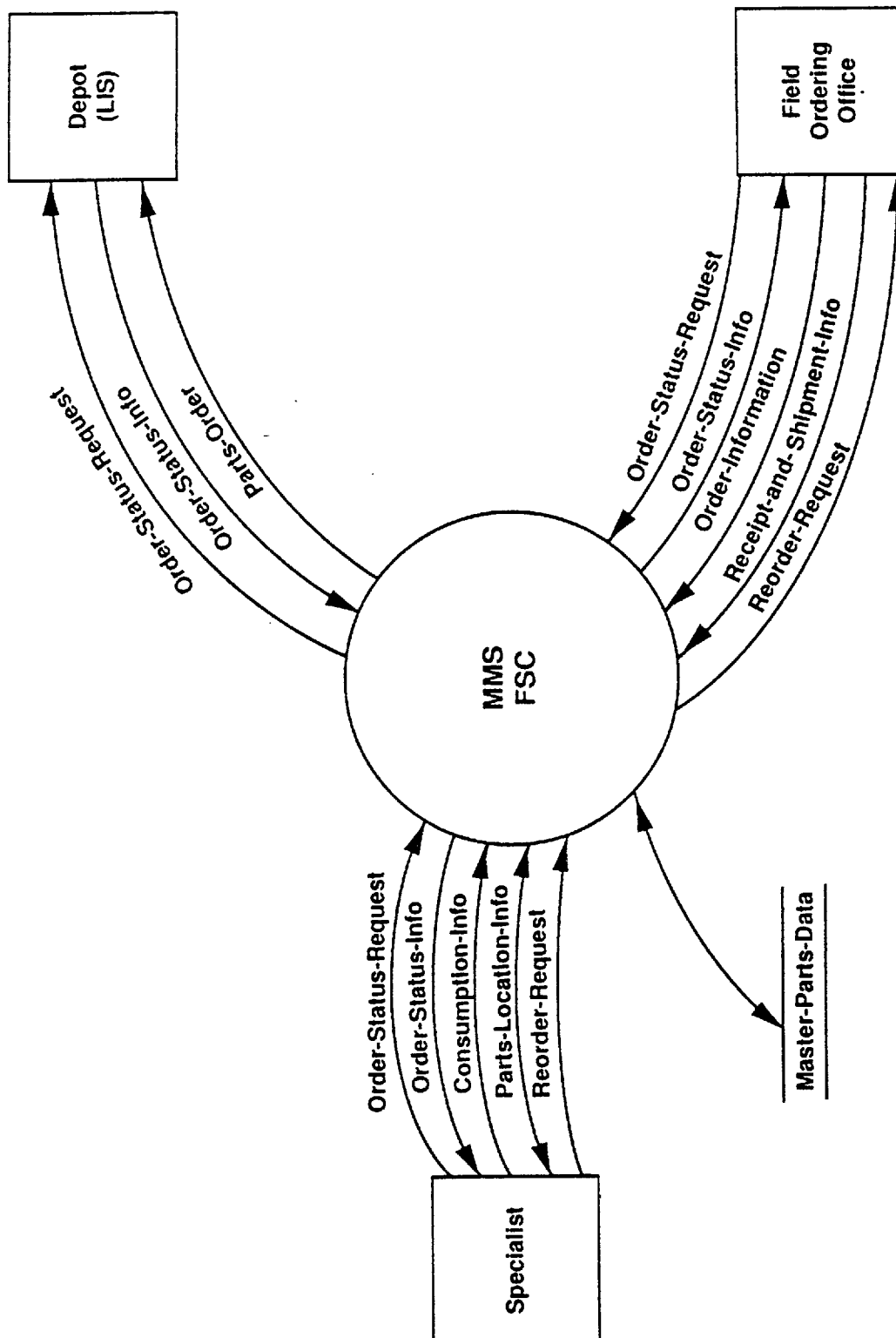


FIGURE 3-6. MMS INFORMATION INTERFACES FOR SPARE PARTS STOCK ACTIVITY

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MMS to identify the part and the quantity used. MMS will decrement the quantity on hand to reflect the quantity used. When the net asset position for a part for which MMS maintains balance information penetrates the reorder point, MMS will notify the specialists and/or logisticians that it may be necessary to reorder parts.

When a spare part for which MMS does not maintain balances is removed from its storage location, the specialist must manually determine penetration of the reorder point. If penetration of the reorder point occurred, the specialist enters a reorder request into MMS.

MMS will maintain information required to format requisitions to be forwarded to the Depot via LIS for Depot supported parts stocked in the field.

Priority requisition requests are not subject to review by the ordering office. MMS will format and transmit them directly to LIS.

The ordering office can review routine specialist initiated ordering requests and MMS generated ordering requests before formatting and transmitting requisitions to LIS.

When LIS accepts a routine or priority requisition, MMS will establish due-in information for the parts ordered. MMS will provide the ordering office and the specialists with reports detailing requisition status information based on information received from LIS. If a shipment has not been received within a specified period of time, the user can request MMS to send a follow-up requisition status request to the Depot.

The Depot will send requisition status information back to the ordering office when parts or materiel cannot be shipped within the standard time allowed for the associated priority or when a follow-up requisition status request has been received. When MMS receives requisition status information from the Depot, it updates the due-in information to reflect the new information received. MMS will generate reports for the ordering office when shipments from the Depot are delayed.

When an order is received by the ordering office, the receiver will enter the shipment information into MMS. If a due-in exists for the parts received, MMS updates the due-in information to indicate that the parts were received. If MMS maintains balances for the parts received, it updates the quantity on hand to reflect the quantity received. Local personnel then place the received parts in the appropriate storage locations.

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When a site ships parts back to the Depot or to another destination, the shipper will enter the shipment information into MMS. If the part is an R&R item, MMS establishes a due-in record to indicate that the site expects the part back. MMS maintains balances for the parts shipped, and updates the quantity on hand to reflect the quantity shipped.

3.4.4 Performance Reporting

This scenario describes the interactions involved in the process of reporting service and facility interruptions, and reportable equipment failures, as shown in Figure 3-7.

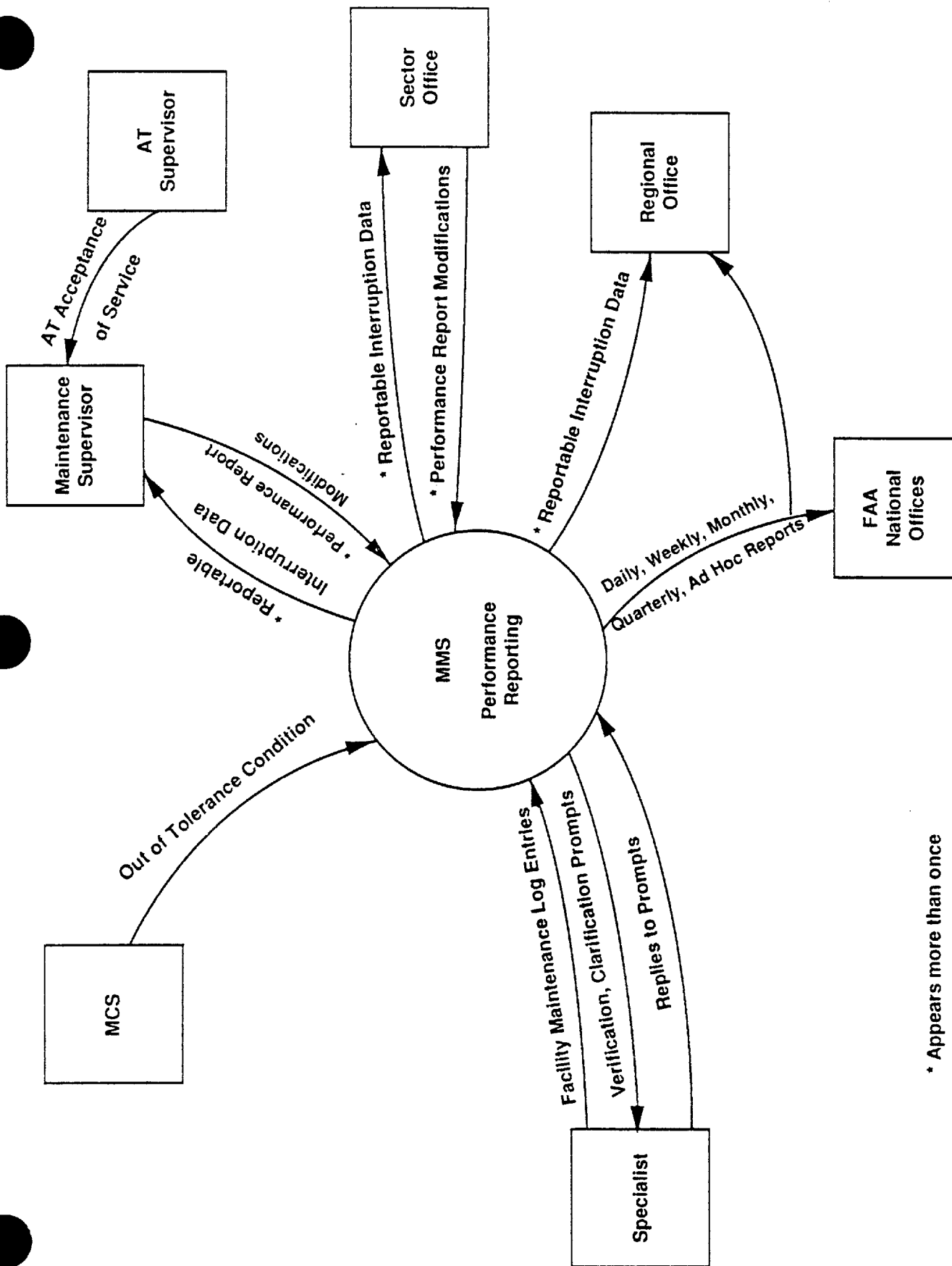
MMS obtains data describing interruptions from two principal sources: facility maintenance log entries and log entries generated by MMS based on data received from MCS.

MMS will open performance events in response to specialist log entries, which indicate the beginning of such events. MMS will associate subsequent log entries with open performance events, and extract data from the log entries necessary to complete required information in the performance event. Finally, MMS will recognize log entries that indicate restoration of a service and will close the performance event accordingly.

After maintenance personnel restore service, the AT supervisor informs the appropriate personnel of service acceptance, which constitutes the end of the interruption. Should AT personnel not require or desire the service at the time of restoration (e.g., an ECOM frequency that was restored but whose use was not required by AT), the restoration constitutes the end of the interruption. Note that AT supervisor acceptance is not required for facilities (e.g., MLS at remote non-AT manned airports) that provide service directly to users (e.g., pilots).

MMS identifies performance events that satisfy the various criteria for upward reporting. The MS/SE and appropriate sector office personnel review all upward reportable interruption reports for completeness and accuracy. Sector personnel accomplish this review at an MMS terminal or by using an MMS report. They may make modifications to interruption event descriptions, but MMS maintains a complete history of these modifications.

MMS collects reportable performance data from all sectors and regions and generates a variety of reports that are available to region and FAA national offices. These reports include regularly-generated daily, weekly, monthly, quarterly, and annual summaries at various levels of detail. Additionally, MMS supports the identification and downloading of performance data to satisfy ad hoc requirements at the national, regional, or sector levels.



* Appears more than once

FIGURE 3-7. MMS INFORMATION INTERFACES FOR PERFORMANCE REPORTING ACTIVITY

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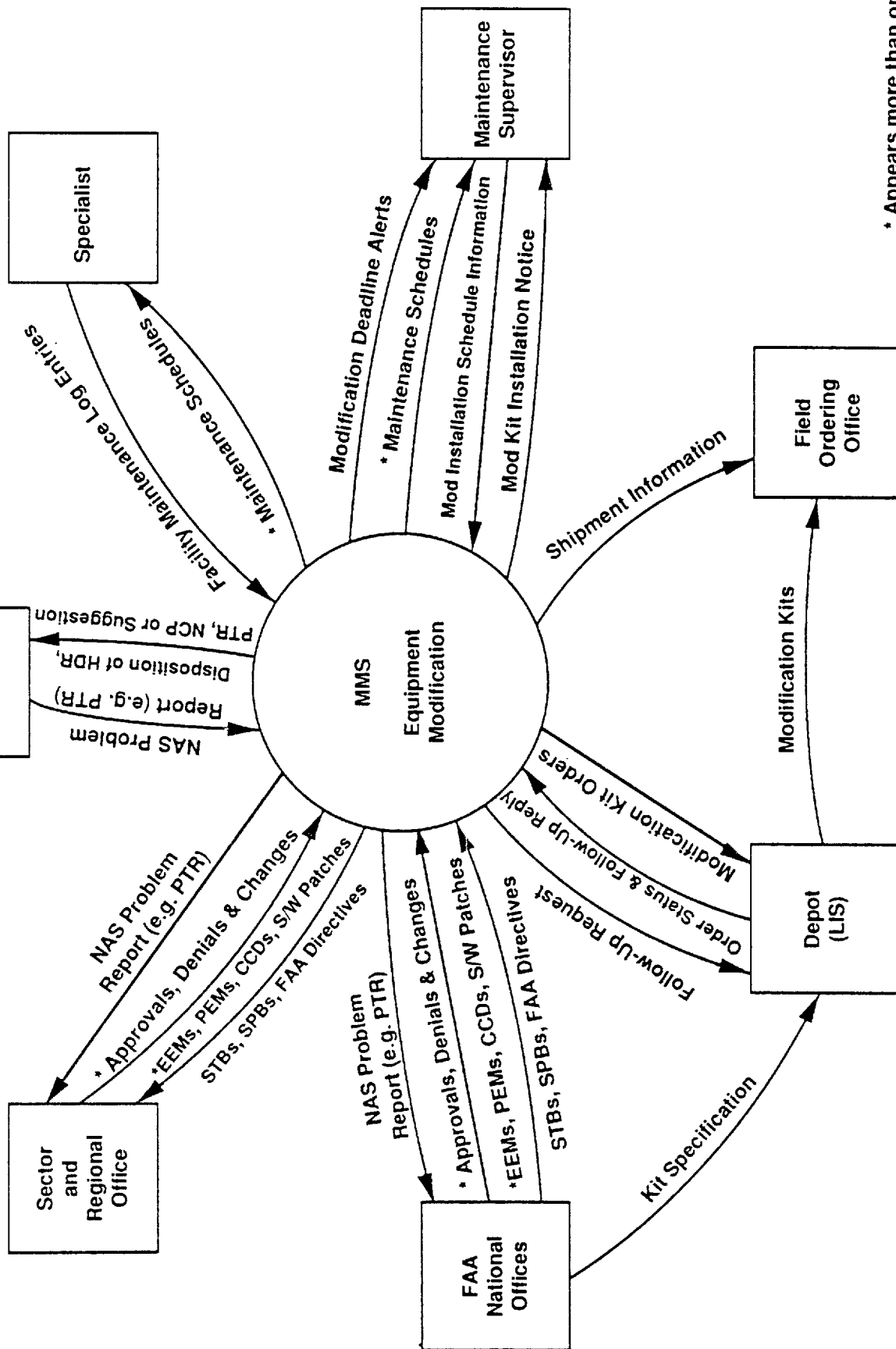
3.4.5 Equipment Modification

This scenario is broad in scope. It covers the origination of an idea or the identification of a problem that eventually leads to the equipment modification, and extends through status reporting of the modification installation process. Figure 3-8 represents the interactions described in the paragraphs below. There are several different ways to initiate the process that may ultimately lead to the modification of equipment in the field. Upon identification of a problem, an FAA employee, usually in a field office, generates an originating document which may be an HDR, a PTR, an employee suggestion, or an NCP. These may be combined in various ways (e.g., an NCP may include an employee suggestion). For HDR's and PTR's, the specialist will use MMS as an aid for entry of the properly formatted, originating document.

3.4.5.1 HDR/PTR Processing Activity

The maintenance specialist, in cases involving national problem reporting through the creation of either a Hardware Discrepancy Report (HDR) or a Program Technical Report (PTR), will use MMS as an aid for entry of the properly formatted, originating document. Personnel at the Sector level will review the originating document using an MDT terminal to access MMS for displaying or generating a hardcopy of the HDR/PTR contained in the local MMS database. The review process may receive local approval or be rejected (e.g., duplicate HDR/PTR, classified as non-problem by sector reviewer). Since the originating document has no official status until it receives sector approval, the sector office may modify the document to conform with standards or conventions or to improve readability. The reviewer will also use an MDT terminal to access MMS and incorporate necessary modifications and to record approvals and rejections.

Once a problem receives sector approval the national processing mechanisms take over. The initial step in this process involves sector use of MMS to transfer the locally approved HDR/PTR to the national problem resolution national database; this database contains HDR's/PTR's generated by other sectors as well as status and resolution information obtained via an electronic interface to the national field support group management information system. The national field support group organizations receive the problem report data through an external interface to their management information system. These organizations review the originating document data, determine if a modification of any kind is required, make any authorized modifications, enter the determination into their management information system and, via an external interface, update the national problem reporting national database. Problem report information in the national database is available to all MMS



* Appears more than once

FIGURE 3-8. MMS INFORMATION INTERFACES FOR EQUIPMENT MODIFICATION ACTIVITY

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users. Sector personnel will use MMS to obtain information on HDR/PTR status as well as information on the final disposition (i.e., date and implementing directive) of their HDR's and PTR's.

3.4.5.2 Other Originating Documents Processing Activity

TBS

3.4.5.3 Equipment Modification Processing

When review of an originating document results in a determination that a modification of any kind is required, the Modifications Engineering Field Support Sector produces a modification specification document; potential items include an EEM, a PEM, a CCD, an STB, an SPB, an FAA directive, a new handbook, or a handbook change. Some of this information may be entered directly into MMS if deemed appropriate while other information is entered into the Program Management System (PMS); CCD and EEM information within the PMS is available to MMS via an electronic interface.

MMS determines the recipients of the modification and their addresses by identifying all of the sites that have the equipment being modified. Depending on the nature and volume of the modification specification, it is either transmitted electronically by MMS to the recipients, or mailed. MMS also updates the FSEP to reflect the modified configuration of the affected sites.

The modification status at this point indicates only that the modification specification was distributed. When the addressee receives the modification specification, MMS records this event in the modification status, which causes a modification workload estimate to appear in schedule projection displays.

For those modifications that require a modification kit, a kit specification is sent to the Depot, and MMS transmits a kit order for each recipient to the Depot as well. Simultaneously, MMS enters an advanced due-in date in the "advanced due-in" file of each ordering office for which kits have been ordered. Until the kit is actually received at the ordering office, MMS interacts with the Depot in the same way as for spare parts ordering (see Section 3.4.3), in terms of follow-up requests and order status information. When the kit is received at the ordering office and the shipment information is entered into MMS, the modification status is again updated and a modification kit installation activity appears in the automatically generated maintenance schedule. The MS/SE qualifies this entry by specifying a date and time and designating the personnel who will accomplish the modification installation.

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The specialist installs the modification and makes an appropriate log entry. MMS recognizes this log entry and updates the modification status to indicate that the modification is installed. MMS also transmits messages to LIS identifying the installed modifications. A deadline for installing each modification is established when the activity is first included into the maintenance schedule by MMS. MMS automatically generates an alert message to the maintenance supervisor when a deadline for a modification installation is approaching.

MMS may be called on to generate reports at the national, regional, and sector levels to summarize the status of modification installation activities throughout the NAS.

3.5 MMS PHASED DEVELOPMENT AND DEPLOYMENT APPROACH

MMS is extensive both in the scope and importance of the functions it will perform, and in the diverse locations of the numerous equipment and terminal installations on which it will be hosted. Consequently, it is imperative that an orderly plan be constructed for the development and deployment of MMS. This plan will ensure that the greatest utility is achieved as early as possible with a minimum of redundant effort during the transition, and absolutely no disruption of NAS services. This detailed plan should be developed concurrently with the system structural design. However, some preliminary observations are presented below.

The FAA will develop MMS in an evolutionary manner consisting of three distinct phases, as shown in Figure 3-9. Phase 1 is oriented towards supporting the logging requirements associated with FAA Order 6000.15, General Maintenance Handbook for Facilities, and initiating the transition process from existing national systems (e.g., NAPRS). Phase 2 is oriented towards automation of additional record keeping functions and the development of automated interfaces between MMS and other FAA management information systems. Phase 3 provides for enhancements to the capabilities developed during the initial phases, as well as for the development of additional capabilities approved through the FAA configuration management process as outlined in FAA Order 1800.8E, NAS Configuration Management.

The FAA will deploy the MMS through a series of national releases. Deployment will proceed in accordance with existing guidelines as outlined in the governing FAA Orders. Six national releases of MMS are envisioned. Releases PIB01 and PIB02 will address MMS Phase 1 capabilities. Releases PIB03, PIB04, PIB05 and PIB06 will address Phase 2 capabilities. Each release, after PIB01, will also provide corrections and enhancements to the previous release. The Maintenance Management System (MMS) Project Implementation Plan Order will govern deployment.

MMS FUNCTIONAL AREAS

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MAINTENANCE OPERATIONS		PERFORMANCE MONITORING	CONFIGURATION AND STATUS
Phase 1	Facility Maintenance Log	Performance Reporting	Facility, Service, and Equipment (including Engine Generators) Profile
	Periodic Maintenance		
	Facility, Service and Equipment Certification		
Phase 2	Miscellaneous Activity Scheduling	Energy Consumption Monitoring (Deleted)	Site Descriptions and Site-Peculiar Information
	Field Stock Control		
	Test Equipment	Performance and Trend Analysis	Modifications (EEMs, PEMs, SPBs, STBs)
	NAS Problem Reports		
	National Airspace System Change Proposals (Deleted)		Configuration Control Decisions
	Employee Suggestions (Deleted)		Problem Resolution
	Maintenance Projects (SMPs, FMPs)		Interim Documentation (Deleted)
	Inspection Records (JAIs, Flight Inspections, Technical Evaluations)		Directives Index (Deleted)
	Personnel Training and Certification		Facility Drawings Index (Deleted)
Phase 3	Enhancements	Enhancements	Enhancements

FIGURE 3-9. PHASING PLAN FOR DEVELOPMENT OF MMS FUNCTIONS

TABLE 3-1. MMS DEVELOPMENT ACTIVITIES

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4. MMS REQUIREMENTS

This section specifies the requirements that MMS must satisfy. These requirements are classified into four categories:

- o Functional requirements;
- o Operational requirements;
- o Performance requirements; and
- o System development requirements.

Requirements in each of these categories are presented in detail in the sections that follow.

4.1 FUNCTIONAL REQUIREMENTS

MMS functional requirements are divided into two major categories; system services requirements and applications requirements. System services requirements are discussed in Section 4.1.1 and applications requirements in Section 4.1.2. Throughout these sections, the word "user" refers to an individual whose duties require the use of MMS and who possesses valid authorization to access the functions and data in question.

4.1.1 System Services Requirements

System services are the services that MMS provides its users to enable them to effectively and efficiently perform desired functions. System services requirements include user interface requirements, data management requirements, data retrieval requirements, and requirements for message communication within and between FAA offices (i.e., electronic messaging). The following subsections detail these requirements.

4.1.1.1 User Interface Requirements

MMS will provide its users with an interactive mechanism that enables them to exercise system capabilities conveniently, flexibly, and reliably. User interface requirements are:

- o Permit users access to MMS data and functions based on their level of authorization. This requirement breaks down into the following lower-level requirements:
 - Permit individuals with valid authorization access to MMS. Record attempts by unauthorized individuals to access MMS.

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- Verify that a user is authorized to perform the requested function and to access the requested data. Users must not be allowed to perform functions or access data without proper authorization.
- Enable users to modify their own passwords.
- o Inform users of available MMS functions upon request and permit function selection.
- o Enable users to enter data interactively into MMS. MMS will prompt users for data, or provide them with a menu of options from which to choose or a transaction template to fill. This requirement breaks down into the following lower-level requirements:
 - Enable users to enter alphanumeric data and free-form text into MMS.
 - Permit users to "back up" to a previous menu on multiple-menu entries.
 - Perform validity checks on user-entered data when appropriate. Validity checks of free-form text fields are not required.
 - Notify the user if a data entry is syntactically incorrect, identify the incorrect item(s), and permit immediate edit of those items.
 - Automatically supply default values if available. Default values are to be displayed along with the data item name. Provide the user the capability to override default value assignment.
 - Prompt users for omitted required data. If a user failed to enter a required data item on a transaction template that he released to MMS, he must be prompted for that item.
 - Enable users to review "help" information during data entry dialogues without losing previously entered data.
 - Enable users to interrupt a data entry dialogue, perform appropriate functions in response to MCS interruptions, and return again to complete the entry without losing previously entered data.
 - Permit users to review and evaluate data input prior to release to MMS.

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- o Enable users to receive output of standard reports and query responses on selected or default peripheral devices. This requirement breaks down into the following lower-level requirements:
 - Provide the capability to display reports and responses on a terminal. Users must be able to scroll or page displays.
 - Enable retrievals generating a high volume of output to be directed to line printer, disk, or magnetic tape at locations where these capabilities exist.
 - Provide local hardcopy output of retrieved data displayed on the terminal at stationary terminal equipment locations. This capability enables users to generate a "snapshot" of a display.
- o Display or print error messages notifying the user that an error was detected by an application program while processing a transaction. Error messages will consist of an error code and a succinct definition of the error.

4.1.1.2 Data Management Requirements

MMS will maintain a collection of data necessary to support maintenance operations, performance reporting, and configuration and status functions in an on-line database. Authorized users will have access to the MMS database and will be able to add, delete, void, modify, and archive database records. Data management requirements are:

- o Provide users with the capability to add records to the MMS database.
- o Provide users with the capability to void facility maintenance log records in the MMS on-line database. Voided records remain on-line but are marked as void. This is analogous to drawing a line through a handwritten facility maintenance log entry.
- o Provide the capability for flexible and fully traceable modification of records in the MMS database. This requirement breaks down into the following lower-level requirements:
 - Enable users to modify records in the MMS database.

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- Maintain a time-stamped version history of MMS database modifications, thereby providing an audit trail.
- Permit numerous modifications to any record in the MMS database.
- Provide the capability to recover from system failures or processing errors by restoring the database to a previous consistent state. This "rolls back" the database to a state prior to the application of invalid or erroneous transactions.
- o Provide a flexible capability for the archival of data records in an off-line mass storage medium. This requirement breaks down into the following lower-level requirements:
 - Enable the DBA to archive database records in off-line storage.
 - Upon DBA approval, automatically archive database records whose on-line retention time has expired. Allow different databases (e.g. FSEP, Facility Maintenance Logging) to be archived separately.
 - Permit the DBA to modify the retention time of any database according to the appropriate FAA orders.
 - Permit users to retrieve archived data for reports.
 - Maintain an on-line index of volumes of archived data.
 - Notify the DBA when the retention period of archived data has passed. Update index upon DBA approval.

4.1.1.3 Data Retrieval Requirements

MMS will provide its users with the capability to retrieve data from the MMS database. Data retrieval requirements are:

- o Provide users with the capability to generate standard MMS reports and data file extractions. (Appendix C lists standard MMS reports.)
- o Provide DBA with the capability to define new reports.
- o Provide a mechanism for users to access the acquired Database Management System to make ad hoc queries.

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- o Allow flexible specification of data to be retrieved for reports and queries. This requirement breaks down into the following lower-level requirements:
 - Permit retrieval of MMS data using single, multiple, or range selection values of one or more search keys.
 - Permit interactive selection of sort criteria for displayed data.
 - Provide the capability to expand MMS codes and acronyms into appropriate text.
 - Provide display of data element types that can be accessed or used as database search keys.
- o Inform a user of the size in pages of a report that is ready to be printed.
- o Permit users to retrieve the history of changes made to any data record.

4.1.1.4 Electronic Messaging Requirements

MMS will provide the capability for users to transmit messages via electronic messaging. Electronic messaging requirements are:

- o Provide the capability for users to originate messages by editing existing messages or by generating new messages.
- o Transmit messages to single or multiple destinations (i.e., individual users or terminal locations).
- o Enable sender to verify receipt of special messages.
- o Inform a user that he has received a message(s).

4.1.2 Applications Requirements

MMS applications are divided into three functional areas:

- o Maintenance operations;
- o Performance reporting; and
- o Configuration and status.

The major functions to be provided by MMS in each of these functional areas are listed in Table 4-1. Additionally, there is

TABLE 4-1. APPLICATION REQUIREMENTS AREAS

MAINTENANCE OPERATIONS	PERFORMANCE MONITORING	CONFIGURATION AND STATUS
Facility Maintenance Log	Performance Reporting	Facility, Service, and Equipment (including Engine Generators) Profile
Periodic Maintenance	Performance and Trend Analysis	
Facility and Equipment Certification	Energy Consumption Monitoring (Deleted)	Site Descriptions and Site-Peculiar Information
Miscellaneous Activity Scheduling		Modifications (EEMs, PEMs, SPBs, STBs)
Field Stock Control		Configuration Control Decisions
Test Equipment		Problem Resolution
NAS Problem Reports		Interim Documentation (Deleted)
National Airspace System Change Proposals (Deleted)		Directives Index (Deleted)
Employee Suggestions (Deleted)		Facility Drawings Index (Deleted)
Maintenance Projects (SMPs, FMPs)		
Inspection Records (JAIs, Flight Inspections, Technical Evaluations)		
Personnel Training and Certification		

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a general application requirement that is presented here because it applies uniformly across all three functional areas. It is:

- o Reject transactions containing invalid data entries and identify entries that are invalid.

4.1.2.1 Maintenance Operations

The following subsections enumerate the requirements of the maintenance operations functional area.

4.1.2.1.1 Facility Maintenance Log

MMS will support the generation of a chronological facility maintenance log. Facility maintenance log requirements are:

- o Support entry of at least the following types of facility maintenance log data:
 - periodic maintenance
 - corrective maintenance
 - equipment modification
 - software modification
 - certification
 - removal of certification
 - administrative action
 - commissioning
 - decommissioning
 - facility/service interruption
 - equipment failure
 - general equipment-related event
 - installation
 - removal
 - flight inspection
 - technical evaluation
 - Joint Acceptance Inspection (JAI)
 - accident investigation
 - automatic equipment alarms (from MCS)
 - restoration
 - AT acceptance
 - facility maintenance log review entry
- o Generate log entries in response to selected messages collected automatically from MCS.
- o Generate log entries from user-supplied data utilizing, to the greatest extent possible, data resident in the database to formulate log entries to relieve the user of unnecessary effort.

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- o Inform users of the procedures to follow for performing special duties related to an aircraft accident, and of the associated log entries required.
- o Record date, time, location (e.g., facility identifier), and user identification for each log entry.
- o Provide applicable data from the facility maintenance log necessary for meeting other MMS functional requirements.
- o Record and identify delayed log entries.
- o Support entry of an accompanying explanation for corrections to a facility maintenance log.
- o Verify user identity prior to recording a log entry.

4.1.2.1.2 Periodic Maintenance

MMS will provide automated support for the scheduling, tracking, and recording of PM activities. PM requirements are:

- o Permit the maintenance supervisor to make local revisions to the PM task schedule to accommodate local variations. Local variations include shift schedules, leave schedules, and other similar personnel resource considerations.
- o Project schedules for PM tasks to be performed within sites or sectors, for evaluation and planning purposes.
- o Automatically schedule PM tasks to be performed over a user-specified time on the order of a day to a month.
- o Identify in the schedule, PM activities that require AT coordination.
- o Permit the maintenance supervisor to refine the weekly PM schedules to account for local personnel resource considerations.
- o Automatically open scheduled PM tasks at the earliest time when the maintenance activity is eligible to be performed.
- o Automatically close scheduled PM tasks and record the completion time and date and other pertinent details when appropriate log entries are made by the user.

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- o Permit a user to close a group of PM tasks related by user-defined PM group number.
- o Keep lapsed PM tasks open until closed by a user.
- o Enable users to produce the following standard PM reports:
 - PM tasks completed within the acceptable interval.
 - PM tasks closed on a date outside of the acceptable interval.
 - Unclosed PM tasks whose latest scheduled date has passed (PM tasks involving equipment that were not available during the acceptable interval will not be included in this category).
- o Notify appropriate personnel that a PM deadline is approaching.
- o Provide a National Equipment PM Requirements file, which sectors shall access to obtain PM requirements for their equipment.
- o Display PM task descriptions upon request.

4.1.2.1.3 Facility, Service, and Equipment Certification

MMS will provide automated support for the scheduling, tracking, and recording of facility, service, and equipment certification activities. Certification requirements are:

- o Automatically schedule certification tasks based on certification requirements specified in pertinent FAA orders.
- o Identify certification activities in the schedule that require AT coordination.
- o Automatically open scheduled certification tasks at the earliest time when the certification activity is eligible to be performed.
- o Display certification parameters, intervals, standards, and tolerances upon request.
- o Close scheduled certification tasks when appropriate facility maintenance log entries are made by the user, or, with specialist approval, when certification data is made available through MCS. When closing a

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certification task, record the completion time and date, and other pertinent details.

- o Notify appropriate personnel that a certification deadline is approaching.

4.1.2.1.4 Miscellaneous Activity Scheduling

MMS will provide automated support for scheduling and tracking miscellaneous activities such as corrective maintenance, Special Maintenance Projects (SMPs), Field Maintenance Projects (FMPs), flight inspections, and technical evaluations. Miscellaneous activity scheduling requirements are:

- o Permit manual scheduling of miscellaneous events by supervisory personnel.
- o Permit designation of scheduled events that require coordination with AT.
- o Provide the capability to notify designated personnel via an automatic alert when selected schedule events are approaching.
- o Provide the capability to notify designated personnel via an automatic alert when recurring activities (e.g., technical evaluations) are approaching.

4.1.2.1.5 Field Stock Control

MMS will provide automated support for the effective control, maintenance, and utilization of field stock. The MMS field stock control requirements are as follows:

- o Provide information to locate where a part is stored within an inventory stocking location.
 - Maintain cross-reference information between field stock items and field storage locations. Field stock items may be identified by National Stock Number (NSN), manufacturer's part number, or item description. Provide capabilities to add, change, and delete the cross-reference information.
 - Provide query capabilities to allow a user to locate where parts are stored within specific inventory stocking locations.
 - Print location reports detailing where parts are stored at an inventory stocking location.

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- o Maintain master parts data regarding field stock items.
 - Maintain MMS item master information for all field stock. The item master information will contain non site-specific data that describes the items. This data will include National Stock Numbers (NSN), item descriptions, unit of issue, hazardous codes, etc.
 - Maintain cross-reference information between manufacturer's part numbers and NSNs.
 - Provide access to the item master and the part number to NSN cross-reference information.
- o Provide support for the requisitioning of materiel from the source of supply (the Depot or GSA Customer Service Centers).
 - Provide information to assist the user in determining the need to requisition selected parts.
 - Transmit requisitions to the Depot for routine and priority requisitions.
 - Establish a requisition log entry and due-in information for materiel requisitioned.
 - If a requisition has been canceled, cancel its corresponding requisition log entry and due-in information.
- o Process requisition status information.
 - Transmit requisition status requests to the Depot.
 - Receive requisition status information from the Depot.
 - Update the requisition log and due-in information.
 - Display requisition status information.
 - Prepare requisition status reports.
- o Record information about field part received and stored.
 - Provide the capability to record the receipt of materiel by updating the requisition log and the due-in information. Display any special handling

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and/or special storage requirements for the materiel. Notify the receiver of the destination of the materiel received, such as a storage location or a specialist.

- o Record the shipment of materiel.
 - Update the shipping log.
- o Establish field inventory balance information.
 - Create a list of field items for which balances are to be maintained at user-selected field inventory stocking locations.
 - Provide capabilities to record the counts of selected field items by condition at selected field inventory stocking locations to populate the automated field inventory balance information.
- o Maintain field inventory balance information.
 - Process transactions that add to the inventory balances for selected field items by condition. These transactions include receipts, transfers in, repairs, removals from installed equipment, and inventory adjustments.
 - Process transactions that subtract from the inventory balances for selected field items by condition. These transactions include consumptions, transfers out, shipments, the disposal of non-required on-hand materiel, and inventory adjustments.
- o Perform Physical Inventories and Reconcile Imbalances.
 - Print inventory count sheets. Inventory count sheets will contain information about selected items that should be stocked at selected inventory stocking locations. They will be used to note the actual quantities counted for each item.
 - Provide the automated inventory count to support the matching of the physical inventory count to the automated inventory count.
 - Provide capabilities to adjust automated inventory balances to reflect the actual physical inventory counts.

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4.1.2.1.6 Test Equipment

MMS will provide automated support for the management of test equipment. The requirements for this capability are:

- o Provide support for the inventory and tracking of test equipment at the Region/Sector level. This requirement breaks down into the following lower-level requirements:
 - Maintain test equipment inventory and location databases which collectively can function as a national test equipment database.
 - Facilitate the exchange of inventory data within MMS with the Personal Property In-Use Management System (PPIMS).
 - Provide the ability to track the movement of items of inventory both locally, and through transfer actions including E&Rs, loans, returns, acquisitions (increases), and deletions (decreases).
 - Report the status (disposition) and location of any or all items of inventory.
- o Provide support for the calibration of test equipment at the Region/Sector level. This requirement breaks down into the following lower-level requirements:
 - Maintain calibration schedules both for items of test equipment and for the standards used for calibration.
 - Provide for automatic and manual rescheduling of calibration events.
 - Identify and locate items due for calibration, and the standards to be used at individual calibration events as specified by the schedule.
 - Maintain a history of calibration data for an item of test equipment including the as-found and as-left readings, and the procedures used.
- o Support national requirements for the management of test equipment, including:
 - The determination of quantity and type of equipment required to certify or maintain services, facilities, and equipment.

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- The determination of equipment obsolescence.
- Identification of equipment requiring replacement for continued support of facilities.
- Identification of test equipment needed for new measurement requirements.

4.1.2.1.7 National Airspace System (NAS) Problem Reporting

MMS will provide automated support for the collection, tracking, and analysis of HDRs and PTRs. HDR and PTR processing requirements are:

- o Provide automated support for the entry, review, and validation of HDRs and PTRs.
- o Categorize HDRs and PTRs.
- o Permit assignment of initial priorities to problems that are identified in HDRs and PTRs.
- o Enable authorized users to set or change the priorities of HDRs and PTRs.
- o Provide the status of HDRs and PTRs through the various stages of evaluation.
- o Make information on the final disposition of their HDRs and PTRs (i.e., date and implementing directive) available to users.
- o Maintain a history of HDRs and PTRs.

4.1.2.1.8 National Airspace System Change Proposals

(Deleted)

4.1.2.1.9 Employee Suggestions

(Deleted)

4.1.2.1.10 Maintenance Projects

MMS will provide automated support for requesting, scheduling, and tracking maintenance projects. Maintenance projects include FMPs and SMPs. Maintenance project processing requirements are:

- o Provide automated support for the entry, review, and approval or disapproval of FMPs and SMPs.

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- o Provide automated support for assignment of SMPs and FMPs to work crews and sectors.
- o Permit automated support for assignment of priorities to FMPs and SMPs.
- o Permit retrieval and update of the status of FMPs and SMPs.
- o Permit automated support for scheduling of FMPs and SMPs.
- o Notify maintenance supervisor of approaching FMP and SMP deadlines.

4.1.2.1.11 Inspection Records

MMS will provide automated support for acquiring and maintaining records of inspections. Inspections include flight inspections, technical evaluations, and JAIs. Inspection record requirements are:

- o Record dates and times of inspections.
- o Record references to reports that describe the results of inspections.
- o Record discrepancies cited during inspections.
- o Record responsible organization and discrepancy resolution deadline for discrepancies that are not resolved during an inspection.
- o Automatically notify appropriate personnel of approaching discrepancy resolution deadlines.

4.1.2.1.12 Personnel Training and Certification

MMS will provide automated support for management of that portion of the Personnel Certification Program which addresses the assessment of the technical competency of personnel assigned, or to be assigned, responsibility for the certification of AF Services, Systems, Subsystems, and Equipment. Personnel Certification and Training requirements are:

- o Accept user input at the sector level. This requirement breaks down into the following lower-level requirements:
 - Permit an authorized user to enter personnel data, local training data, certification authorization

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- data and responsibility assignment data for individual personnel.
- Permit an authorized user to enter certification authorization.
- Permit a sector manager to review and indicate concurrence or non-concurrence of an individual's certification data.
- o Provide summaries of certification and training data. This requirement breaks down into the following lower-level requirements:
 - Produce reports of personnel training/certification information including certifications, annual review history, courses taken, equipment trained on, and current and past responsibilities.
 - Produce reports containing training course information including a list of employees in the sector who have/have not successfully completed the course.
 - Produce a list of personnel authorized to certify a system/subsystem/equipment.
- o Accept national training data from and provide certification authorization and responsibility assignment data to the CPMIS system.
- o Permit the transfer of personnel certification and training related records in the event of a sector reassignment.
- o Compare an individual's new responsibility assignments against his certification authority to ensure they are related.
 - Permit the supervisor to enter a recommendation to change personnel responsibility assignments pending appropriate approval.
 - Permit the sector manager to review the recommendation and indicate his concurrence.

4.1.2.2 Performance Monitoring

The following subsections enumerate the requirements of the performance monitoring functional area.

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4.1.2.2.1 Performance Reporting

MMS will maintain a clear record of performance events (i.e., service and facility interruptions, line outages, and reportable equipment failures) from log entries as they occur, from user inputs, and from other available data. Performance reporting requirements are:

- o Collect information concerning upward-reportable performance events as specified in FAA Order 6040.15, and include equipment failures down to the LRI (i.e., specialist repairable) level.
- o Open performance event entries in response to facility maintenance log entries that logically indicate the beginning of such an event.
- o Close performance event entries in response to user input.
- o Provide a mechanism to identify facility maintenance log entries that contribute information to upward-reportable performance events. Transfer data into, and close these performance events as appropriate.
- o Identify performance events that meet upward-reporting criteria.
- o Report previously closed upward-reportable performance event entries that are corrected as corrected entries.

4.1.2.2.2 Performance and Trend Analysis

MMS will provide data maintenance and extraction capabilities to support performance and trend analyses based on data received from facility maintenance log entries, from Maintenance Work Centers, and from the Depot. External trend analysis computational facilities will provide a mechanism to forecast future values of a time series from current and past values. Performance and trend analysis requirements are:

- o Maintain current data required to calculate availability, reliability, mean-time-between-interruption (calculated for systems), mean-time-between-failure (calculated for components), and mean-time-to-restore for services, facilities, and reportable equipment. TELCO line outages will be recorded, and will include full line numbers.

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- o Maintain the historical data of numbers of events over time, and their duration to support projections of performance into the future.

4.1.2.2.3 Energy Consumption Monitoring

(Deleted)

4.1.2.3 Configuration and Status

The following subsections enumerate the requirements of the configuration and status functional area.

4.1.2.3.1 Facility, Service, and Equipment Profile (FSEP)

MMS will provide automated support for maintaining a complete and accurate accounting of NAS services and facilities (both current and future [i.e., those formerly resident in the Precommissioned Facilities File]), and equipment (including Engine Generators). FSEP requirements are:

- o Adjust records in the MMS FSEP to account for all service and facility (both current and future), and equipment configuration changes. This requirement breaks down into the following lower-level requirements:
 - Allow MMS users to record the installation and removal of equipment. This must be achievable via log entry or direct interactive update.
 - Allow MMS users to record the status of services, facilities, and equipment at all sectors and sites. This must be achievable via log entry or direct interactive update.
 - Allow MMS users to record the transfer of equipment location and responsibility. This must be achievable via log entry or direct interactive update.
- o Generate FSEP data sets for those organizations that require them (especially those organizations that currently receive FMF data sets from the existing FMF System).
- o Maintain in the FSEP, at least those data items currently maintained in the FMF.

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4.1.2.3.2 Site Descriptions and Site-Peculiar Information

MMS will provide automated support for maintaining site description information, which includes site-peculiar information for certain facilities. Site description and site-peculiar information requirements are:

- o Maintain standard site description information including mailing address, responsible region or sector, building and environment characteristics, and other information as defined by the FAA.
- o Maintain site-peculiar information including seasonal conditions, description of site, description of access to the site, type of overnight accommodations, and other site peculiarities as defined by the FAA.

4.1.2.3.3 Modifications

MMS will provide support for preparing, tracking, and disseminating modifications. Modifications include equipment modifications, software (program) modifications, and changes to operational procedures. Modifications processing requirements are:

- o Provide automated support for the entry of EEMs, PEMs, SPBs (which might be accompanied by software patches or software listings), and STBs.
- o Determine modification recipients and send modification documentation (EEMs, PEMs, SPBs, and STBs) to these recipients.
- o Route modification kit recipient lists to the FAA Depot.
- o Notify modification kit recipients of the expected arrival date of their kit.
- o Record the date that a modification kit is received at a site.
- o Provide the capability to determine modifications that have not been completed and those that are delinquent.
- o Maintain an account of modification history for each piece of equipment.

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4.1.2.3.4 Configuration Control Decisions

MMS will provide automated support for the preparation and dissemination of CCDs. CCD processing requirements are:

- o Provide automated support for the entry of CCDs.
- o Transmit CCDs on a national and local basis.
- o Maintain a history of CCDs.

4.1.2.3.5 Problem Resolution

MMS will provide automated support for the collection of Engineering Notes from Engineering Divisions and the dissemination of these notes to the appropriate FAA field sites. Engineering Note processing requirements are:

- o Provide automated support for the entry of Engineering Notes.
- o Determine Engineering Note recipients.
- o Route Engineering Notes to the identified FAA field sites.
- o Maintain a history of Engineering Notes.

4.1.2.3.6 Interim Documentation

(Deleted)

4.1.2.3.7 Directives Index

(Deleted)

4.1.2.3.8 Facility Drawings Index

(Deleted)

4.2 MMS OPERATIONAL REQUIREMENTS

This section presents the operational requirements for MMS. These requirements define the manner in which MMS will support user interaction and user-involved operations. The operational requirements are classified into the following categories: (1) system access, (2) user assistance, and (3) training.

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4.2.1 System Access

FAA maintenance personnel shall have access to MMS through fixed terminals at all Maintenance Work Centers, ARTCCs, hub airports, regional offices, and sector offices. Each of these fixed terminals shall have access to a printer to provide hardcopy. Users will access MMS from other sites by portable terminals over dial-up, leased, or RMM lines. Any terminal used to access the MMS pathway must be compatible with the Tandem model 6530 terminal.

MMS shall be capable of accepting delayed facility maintenance log entries from data-logging terminals, which may be used for collecting facility maintenance log entries at sites that have no telecommunications lines suitable for use by MMS.

Analysts and managers at FAA HQ shall have access to MMS via terminals. Each terminal shall have access to a low-speed printer to provide hardcopy. A line printer shall also be provided at the executive site for software development and output of large reports.

Access to MMS must be restricted through the use of appropriate security techniques, including use of user identifiers, passwords, and keys. The ability of a given user to access, modify or enter any class of MMS data will be restricted by the authorization granted him by his supervisor, in coordination with the MMS National Database Administrator.

4.2.2 User Assistance

MMS shall provide users with assistance in using MMS. This assistance will include the following capabilities:

- o Enable a user to display a list of MMS functions.
- o Enable a user to switch easily from use of one MMS function to another (e.g., from periodic maintenance schedule display to facility maintenance log entry).
- o Provide user with explanatory messages in the event of data entry error.
- o Provide, on request, explanatory text describing the purpose and operational procedures for any MMS function.
- o Provide user with a display of standard data extractions that are available through MMS, and the means to select a data extract and specify content parameters with minimal data entry.

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- o Provide user with a display of standard reports that are available through MMS, and the means to select a report and specify report parameters with minimal data entry.
- o Inform user of the size in pages of a report that is ready to be printed.

4.2.3 Training

The FAA must develop a plan for training MMS operations personnel and MMS users, and must carry out that plan by providing training materials and conducting training. The training program must be sufficiently comprehensive to enable the user to use MMS effectively in performing his duties with minimal assistance from MMS Support Staff.

The training program may include computer-based instruction (CBI) and provision of expanded error messages and explanatory text ("HELP" files), available at the request of the user.

4.3 PERFORMANCE REQUIREMENTS

The performance requirements presented in this section specify the maximum response time, throughput, capacity, and availability/reliability/maintainability acceptable in the operational MMS.

4.3.1 Response Requirements

This section specifies the response requirements that MMS must satisfy. Response requirements are specified for transactions that represent typical uses of MMS (see Table 4-2). These are:

- o Session initiation: The MPS shall accept and validate user sign-on and provide user with a menu of MPS functions within an average time of 20 seconds and a maximum time of 30 seconds.
- o Subsystem data request: (Deleted)
- o Message processing: The MPS shall post for delivery or retrieve for display, electronic mail messages of up to 1000 characters in length sent to or received from RMMS users within an average time of 15 seconds and a maximum time of 30 seconds.
- o Log entry validation: The MPS shall accept a facility maintenance log entry, check its syntax, and display to the user for possible modification within an average time of 5 seconds and a maximum time of 10 seconds.

TABLE 4-2. MMS RESPONSE REQUIREMENTS

TRANSACTION	MEDIAN AVERAGE RESPONSE (SEC.)	MAXIMUM RESPONSE (SEC.)
Session Initiation	20	30
Subsystem Data Request (Deleted)	5	8
Message Processing	15	30
Log Entry Validation	5	10
Log Entry Creation	12	20
Log Entry Retrieval	5	8
Schedule Retrieval	10	20
Schedule Modification	5	8
Part Location	5	8
Request for Report Status	15	30
Report Initiation	15	20
Query Processing	15	30
Initiate Analysis Program	15	20

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- o Log entry creation: The MPS shall accept a valid facility maintenance log entry and record it in the database, available for immediate retrieval, within an average time of 12 seconds and a maximum time of 20 seconds.
- o Log entry retrieval: The MPS shall retrieve a facility maintenance log entry from the local database, given its log identification number and display current status and details, within an average time of 5 seconds and a maximum time of 8 seconds.
- o Schedule retrieval: The MPS shall retrieve a schedule of open periodic maintenance and certification activities for a work area within a sector/subsector, and display the first 14 records from the local database, within an average time of 10 seconds and maximum time of 20 seconds.
- o Schedule modification: The MPS shall accept, process, and acknowledge a request to add, delete or modify an event in the local file of periodic maintenance and certification activities that are routinely scheduled, within an average time of 5 seconds and a maximum time of 8 seconds.
- o Part location: The MPS shall accept and process a request to locate a controlled spare part from local stock and provide a response to the user indicating whether the part is available, within an average time of 5 seconds and a maximum time of 8 seconds.
- o Request for report status: The MPS shall determine and display the current status of any Hardware Discrepancy Report (HDR), Program Technical Report (PTR), employee suggestion, or facility waiver request at the node where this information is stored, within an average time of 15 seconds and a maximum time of 30 seconds.
- o Report initiation: The MPS shall accept and process a request to produce a report, initiate execution of the report, and return control of the terminal back to the user, within an average time of 15 seconds and a maximum time of 20 seconds.
- o Query processing: The MPS shall accept and process a local database query and that requires location, formatting, and display of 14 facility maintenance log records using a single full retrieval key, within an average time of 15 seconds and a maximum time of 30 seconds.

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- o Initiate analysis program: The MPS shall accept and process a request to run a program that analyzes information contained in the MPS database, within an average time of 15 seconds and a maximum time of 20 seconds. The program must be available in an on-line program library, and the data to be used must be available in the local on-line database.

In addition to the response requirements specified above, MMS must be capable of collecting and integrating all data required for inclusion in the daily NAS status report, and then making the report available by 5:30 a.m. local time to users that request it.

4.3.2 Capacity and Throughput

MMS capacity and throughput requirements are presented in a report titled Engineering Analyses and Trade Studies for the Maintenance Management System (Reference 19). Also, the Maintenance Processor Subsystem Sizing Study (Reference 20) quantifies the MPS in terms of the number of Tandem computers required and the average response times that each MPS should achieve.

4.3.3 Availability/Reliability/Maintainability

MMS must be capable of continuous operation at each MPS site, 24 hours per day. Overall system availability at each MPS site must be at least 95 percent. This requires that the cumulative downtime must not exceed 5 percent of the normal hours of system operation. Included in the cumulative downtime is to be no more than one period of up to 24 hours of continuous downtime in any 6 month period. In addition to this 24 hour period, there may be no more than one other period of up to six hours of continuous downtime in any one month period. Scheduled database maintenance must be required no more frequently than once every 30 days, and require no more than 4 hours. During MMS-related outages, there must be a way to capture log entries and other relevant information and to input these into MMS when the system becomes available.

4.4 SYSTEM DEVELOPMENT STANDARDS

This section defines the standards and methodologies to be applied to the MMS design, development, and test efforts. It also defines documentation standards and specifies operating system and Database Management System (DBMS) requirements, along with human engineering requirements.

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4.4.1 Design Standards

System-level design of MMS shall proceed in accordance with the structured methodology described in the MMS Software Development Plan. Analysis of MMS functions down to the primitive functional level is required. A complete data dictionary defining the composition of all data stores, and diagrams showing the relationships between files and software components must be developed. Process descriptions detailing the processing required to perform each primitive function must also be provided. This material must be packaged into the MMS System Design Document.

4.4.2 Implementation Standards

Development of MMS must proceed in accordance with the Software Development Plan, the System Design Document, and the applicable standards listed in Section 2 of this document. Software will be developed in a methodical, structured manner, to promote traceability from high-level requirements through system design, detailed design, coding, and testing. The software design must be modular so that new equipment and functions/procedures can be added, deleted, and changed without major changes to the system architecture.

Supporting data, such as constants, tables, and catalogs, shall be organized in database form. Extensive use of database facilities is required to parameterize values used in software and to provide a single source for such values.

Detailed design must be performed in accordance with the structured techniques defined in Applicable Standards, and the Software Development Plan produced by the development contractor and approved by the FAA technical monitor. The Software Development Plan explicitly addresses issues of software integration and build control, software requirements control, released system control, software library control, support documentation control, software configuration management, software audit, and quality assurance.

System and applications software and processing algorithms shall be properly documented to permit maintenance, modification, and addition of programs. Software maintenance, including development of new programs, must be accommodated within the MMS host computer without having to resort to other or additional equipment. System and applications programs must be loaded from conventional devices such as disk, computer-compatible tape, or diskette. The contractor must provide all requisite descriptions and procedures to perform these functions. Special attention must be paid to system generation (compiling, loading, overlaying, and saving of both system and applications software) and to reloading, and restarting after system failure or malfunction.

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In the event of system malfunction, system operation shall be halted until appropriate action has been taken.

All programs developed for MMS shall be written in a High Level Language (HLL) such as:

- o FORTRAN, in accordance with ANSI-STD-X3.9-1978;
- o COBOL, in accordance with ANSI-STD-X3.23-1974;
- o Ada, a common DOD HLL (ADA-A073661, ADA-A072854); or
- o A Data Manipulation Language (DML) or applications development language compatible with the DBMS selected for use in MMS.

The language or languages to be used for development of MMS software shall be approved by the FAA prior to use.

Assembly language may supplant HLL only when storage or timing requirements are critical, where the use of HLL is not feasible or cost-effective over the life of the system, or where it is necessary to satisfy performance requirements. Use of assembly language is subject to prior FAA approval. Requests to utilize assembly language must be submitted in writing to the FAA, and must include technical justification and an estimation of the cost and schedule impact involved.

The techniques of structured programming must be used in all MMS software.

All communications for processing, I/O transfer, or display must be conducted through well-specified interfaces. All data shall have a data-type definition specifying characteristics of the data.

All programs must be modular. Each module shall be a logically coherent object with clearly-defined input, output, and inter-module interfaces. Decomposition of the MMS subsystems into modules shall be in accordance with the principle of information hiding to prevent complex inter-module interfaces. Programs must be designed in a hierarchical manner, and the levels of the hierarchy must correspond to the levels of abstraction.

4.4.3 Human Factors

The design must be adapted for FAA users experienced with predecessor systems as well as incorporate human engineering principles and practices, to ensure that satisfactory performance can be achieved by the operating and maintenance personnel, that

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skill requirements and training time are minimized, and that the reliability of the personnel/equipment combination is at a maximum.

4.4.4 Documentation

Computer programs must have adequate and complete documentation with which to evaluate, modify, maintain, and operate the programs and conduct training. Documentation must have modular design for easy modification and expansion. The detailed design of each MMS component must be documented in the System Design Document.

4.4.5 Operating System

The design and structure of operating system(s) acquired for use in MMS must follow design practices of modern off-the-shelf, interrupt-driven real time operating systems. It/they shall provide the capabilities for multiprogramming, multiprocessing, multitasking, fault tolerance and batch processing. The acquired operating system(s) shall be compatible with the acquired DBMS and other commercial software packages acquired to enhance or expedite the operation of MMS.

4.4.6 Database Management System

The DBMS acquired for use in MMS shall follow design practices of modern off-the-shelf DBMSs, and shall provide complete data definition, data manipulation, query processing, and report generation capabilities. It shall be capable of accommodating complex interrelationships among records. The acquired DBMS shall be able to respond to single queries that require access to multiple record types. It shall support a logical data model, storage organization, and access methods that allow:

- o storage of the MMS database with minimal data redundancy; and
- o rapid parsing of the database in response to complex queries.

The acquired DBMS shall provide an easy-to-use query language for use by non-EDP MMS users. This language should support selection and display of any fields from any records by a single command without requiring the user to know the structure of the database. Ease-of-use of the programming language interfaces is important but less significant than the on-line query language.

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4.4.7 Test Standards

The MMS software must be developed using a staged implementation and test approach. This approach consists of performing detailed subsystem design, coding, integration, and testing for each of a sequence of releases. Each release of MMS must be subjected to three levels of testing: unit, subsystem, and integration. Each release must also be subjected to acceptance testing. A top-down testing methodology must be employed and must be conducted in parallel with the design and implementation effort, though lagging it slightly. Data used to perform the tests must consist of valid and invalid occurrences so that exception handling of the software is tested.

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SECTION 5. QUALITY ASSURANCE

This section defines the quality assurance requirements for the design and development of MMS. Quality Assurance (QA) ensures the satisfaction of the MMS requirements throughout the MMS life cycle. The MMS contractor must realize this objective with a QA approach that is clear, cohesive, comprehensive, and orderly in its execution. The contractor's approach must be embodied in a Quality Assurance Plan, and will be subject to FAA approval. Section 5.1 describes the QA Plan as a product. Section 5.2 identifies the organizational issues the QA Plan must address, and Section 5.3 contains the minimum set of functions that must be outlined by the QA Plan.

5.1 QUALITY ASSURANCE PLAN

The MMS development contractor must describe in a written Quality Assurance Plan, the controls and procedures that will be applied to assure the satisfactory design and development of MMS. The Plan must span the entire development life cycle. It must include the methods and procedures to be used in controlling the process of developing the products of each phase in the life cycle, and the means for verifying the quality of each product. The Plan must include a description of the QA organizational structure and the functions to be performed by the organization. The QA Plan must be approved by the FAA, and must focus on three areas:

- o System QA, which assures the satisfaction of the total system requirements.
- o Software QA, which assures the satisfaction of all software requirements, including design and development standards.

5.2 ORGANIZATION

The QA Plan must specify the management structure that will oversee the QA functions. Included in the management structure must be the specification of areas of responsibility, and the personnel assuming those responsibilities. The relationships between personnel must be clearly defined, and the procedures for interfacing the various components of the structure must be outlined.

In addition to specifying the internal structure of the QA organization, the QA Plan must describe the QA position within the MMS project management structure. The interface between the QA organization and other sections of the MMS development effort must be outlined, and the controls and procedures governing those

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interfaces must be specified. The QA organization must have sufficient responsibility and authority to identify and evaluate quality problems, and to initiate, recommend, or provide solutions.

5.3 QUALITY ASSURANCE FUNCTIONS

The MMS contractor's QA Plan must include at least four functions: (1) ensure adherence to standards, (2) monitor testing, (3) support configuration management, and (4) provide customer visibility. Other functions may be included in the QA Plan, such as independent testing, which the contractor may deem necessary to implement an effective QA approach.

The QA Plan must describe the controls and procedures the MMS contractor will use to assure the project's adherence to standards. These standards are primarily design and development standards, although this function must be applied to any standards applicable at any point in the MMS life cycle. In addition, the Plan must describe the manner in which the results of this function are made available to project management.

It is the responsibility of the QA organization to monitor all tests. The QA Plan must describe the level of involvement. Minimally, the Plan must describe how the organization will assure the effectiveness and completeness of the tests, ensure the correct application of the tests, and verify the results of the tests. Controls and procedures for monitoring the tests must be outlined. The contractor may extend the responsibilities of the QA organization to include independent test development and execution if it is desired. All controls and procedures for extended responsibilities must be outlined.

The QA organization must also monitor the MMS contractor's application of the configuration management approach. In this role, the QA organization assures the adherence to the Configuration Management (CM) Plan, ensuring all changes are implemented according to the procedures outlined in the CM Plan. This establishes the baseline description prior to the advance to the next stage in the development, and providing visibility into the CM function to project management. The QA Plan must describe all controls and procedures the contractor will employ to ensure correct execution of this function.

Finally, the QA organization must enable the FAA to view the results of the execution of the QA functions. To provide this visibility, the QA Plan must describe procedures the contractor will utilize, and the products that will be available to the FAA. The procedures shall include audits or reviews. QA products will generally take the form of documents and reports. In addition to the above functions, the QA Plan must also provide for: controls to assure that all inspection and testing is performed in

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compliance with contract requirements, and that all test data is complete, correct, traceable, repeatable, and acceptable; maintenance of a proper record keeping function to provide objective evidence and traceability of operations performed in all phases through final acceptance; QA review of all software documentation; and, if applicable, procedures and controls for assuring that all software procured from subcontractors conforms to contract requirements.

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APPENDIX A

CALCULATION OF RESPONSE TIMES

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CALCULATION OF RESPONSE TIMES

The method to be used to calculate average and maximum response times for MMS is detailed below.

- Step 1: Accumulate measured response times for a given transaction type over a period of one week or more. Ignore transactions that were never completed. If fewer than 100 measurements are available, accumulate measurements until at least 100 are available. Transactions should be accumulated in a random fashion over all shifts.
- Step 2: Order the measurements by length of response time.
- Step 3: Calculate the median by determining the middle measurement, if there is one, otherwise as the interpolated middle value.
- Step 4: Calculate the maximum response time by discarding the last 5% (i.e., 5 measurements/100) of the measurements; the measurements to be discarded have the longest response times. The largest remaining measurement is the maximum response time.

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APPENDIX B

GLOSSARY OF ACRONYMS

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GLOSSARY OF ACRONYMS

AAF	FAA Associate Administrator for Airway Facilities
AES	FAA Systems Engineering Service
AF	Airway Facilities
AFIS	Automated Flight Inspection System
AMIS	Aircraft Management Information System
APS	FAA Program Engineering Service
ARTCC	Air Route Traffic Control Center
ASE	FAA Office of System Engineering & Program Management
ASM	FAA Systems Maintenance Service
AT	Air Traffic
CBI	Computer-Based Instruction
CCD	Configuration Control Decision
CM	Configuration Management
CPMIS	Consolidated Personnel Management Information System
DBA	Database Administrator
DBMS	Database Management System
DML	Data Manipulation Language
DOD	Department of Defense
E&R	Exchange & Repair
ECOM	En Route Communications
EDP	Electronic Data Processing
EEM	Electronic Equipment Modification
EFSS	Engineering Field Support Sector
FAA	Federal Aviation Administration
FLIP	Flight Information Publication
FMF	Facilities Master File
FMP	Field Maintenance Project
FSEP	Facility, Service, and Equipment Profile
GNAS	General National Airspace System Sector
HDR	Hardware Discrepancy Report
HLL	High Level Language
HQ	Headquarters
ICD	Interface Control Document
ILS	Instrument Landing System
JAI	Joint Acceptance Inspection
LIS	Logistics and Inventory System
LRI	Lowest Repairable Item
MARS	Maintenance Automation Reporting System
MCC	Maintenance Control Center
MCS	Monitor and Control Software
MLS	Microwave Landing System
MMS	Maintenance Management System
MPS	Maintenance Processor Subsystem
MS	Maintenance Supervisor
NAPRS	National Airspace Performance Reporting System
NAS	National Airspace System
NCP	NAS Change Proposal
NFDC	National Flight Data Center
NFIS	NAS Facilities Information System

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OPI	Office of Primary Interest
PEM	Plant Equipment Modification
PFF	Precommissioned Facility File
PM	Periodic Maintenance
PMS	Program Management System
PPIMS	Personal Property In-Use Management System
PTR	Program Technical Report
QA	Quality Assurance
R&R	Repair & Return
RMM	Remote Maintenance Monitoring
RMMS	Remote Maintenance Monitoring System
RMS	Remote Monitor Subsystem
SE	Systems Engineer
SEI	System Engineering and Integration
SPB	Site Program Bulletin
STB	Site Technical Bulletin
TELCO	Telephone Company
TELMS	Telecommunications Management System
TID	Technician-In-Depth
UAS	Uniform Accounting System
UCR	Unsatisfactory Condition Report

NOTE: Some of the acronyms presented in this glossary are used exclusively for this document.

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APPENDIX C

MMS REPORTS

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MMS REPORTS

Appendix C lists the national reports that will be produced by MMS.

LOGGING GENERAL PURPOSE REPORTS:

DETAILED REPORT OF LOG ACTIVITY FOR AREA (XXXXXX)
SUMMARY REPORT OF LOG ACTIVITY FOR AREA (XXXXXX)
ARCHIVED LOG DATA REPORT
LOG INCIDENT SUMMARY LISTING
LOG INCIDENT SUMMARY LISTING FOR SECTOR (XXXXX)
LOG INCIDENT SUMMARY LISTING: LATEST ENTRIES

LOGGING INTERRUPT/OUTAGE REPORTS:

LOG ENTRY DETAIL LISTING FOR (FAC TYPE/IDENT)
FACILITY/SERVICE OUTAGES (6040-12)
LINE PERFORMANCE DETAIL LISTING (6040-63)
CLOSED INTERRUPT DETAIL LISTING BY FACILITY/SERVICE
FACILITY AND SERVICE OUTAGE REPORT (6040-3)
FACILITY AND SERVICE OUTAGE REPORT (6040-3) FOR (FAC TYPE)
LINE PERFORMANCE REPORT (6040-7)

LOGGING ENTRY TYPE SPECIFIC REPORTS:

CERTIFICATION HISTORY LISTING
MMS AIRWAY FACILITIES MODIFICATION REPORT AS OF MM/DD/YY
PM/CERT TASKS AT/BEYOND LATEST DATE
PM/CERT DAILY SCHEDULE

LOGGING DATA EXTRACTION REPORTS

CREATE LOG EXTRACT FILE AND DOWNLOAD TO PC
FACILITY AND SERVICE OUTAGE REPORT (6040-3) - DATA
EXTRACTION
LINE PERFORMANCE REPORT (6040-7) - DATA EXTRACTION

IMCS REPORTS:

IMCS CURRENT STATUS REPORT
IMCS HISTORY REPORT
IMCS USER HISTORY REPORT

ADMINISTRATIVE REPORTS:

AUTHORIZED MMS USERS BY INITIALS
CALL BACK LIST FOR FACILITY (FAC TYPE/IDENT)
LINE/FREQUENCY LISTING BY FACILITY/SERVICE
UPLINK AUTHORIZATION LISTING BY USER
MMS LOG ON FAILURES
MMS SUBSYSTEM ACCESS LEVEL FAILURES
FACILITY AUTHORIZATION LISTING BY USER
MMS PERSONNEL LISTING
ASSOCIATED/RELATED FACILITIES BY FACILITY

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P/M CERTIFICATION REPORTS:

SCHEDULED MAINTENANCE FORECAST
CERTIFICATION STATEMENTS BY CERTIFICATION REFERENCE NUMBER
P/M AND CERTIFICATION SCHEDULING DETAIL LISTING
PERIODIC MAINTENANCE TASKS BY TASK GLOSSARY REFERENCE
NUMBER
P/M AND CERTIFICATION SCHEDULING MASTER LIST
PERIODIC MAINTENANCE PERFORMANCE REPORT (DETAIL)
PERIODIC MAINTENANCE PERFORMANCE REPORT (SUMMARY)

FSEP DATA EXTRACTION REPORTS:

CREATE FEQ EXTRACT FILE AND DOWNLOAD TO PC
CREATE FMF EXTRACT FILE AND DOWNLOAD TO PC
CREATE FPS EXTRACT FILE AND DOWNLOAD TO PC
CREATE PFF EXTRACT FILE AND DOWNLOAD TO PC

FSEP FACILITY/SERVICE REPORTS:

FACILITY/SERVICE SUMMARY BY REGION, BY TYPE
FACILITY/SERVICE DESCRIPTIONS BY LOCATION IDENTIFIER FOR
REGION
FACILITY/SERVICE DETAIL BY FACILITY TYPE FOR SECTOR CODE
FMF ON-LINE UPDATE FORM (6000-12)

FSEP EQUIPMENT/MODULE REPORTS:

EQUIPMENT/MODULE/PMMAST SUMMARY BY FACILITY TYPE/IDENT
EQUIPMENT LIST BY SECTOR, SUBSECTOR, AREA AND LOCATION
EQUIPMENT LISTING BY FA/CA NUMBER
EQUIPMENT LIST BY FACILITY TYPE/IDENT, SECTOR SUBSECTOR
MODULE DETAIL BY EQUIPMENT FOR FACILITY TYPE/IDENT
MODULE SUMMARY BY FA/CA NUMBER BY FACILITY TYPE/ IDENT
EQUIPMENT DETAIL BY FACILITY TYPE/IDENT BY SECTOR SUBSEC

FSEP VALIDATION REPORTS:

VALID COST CENTER/SECTOR CODES
VALID FACILITY TYPE/CODE/CLASS
VALID FACILITY TYPE/STATUS CODES
VALID LOCATION IDENTIFIERS
VALID SHORT NAME BY FA/CA NUMBER

FSEP POWER SYSTEM REPORTS

DETAIL BY EQUIPMENT TYPE, SYSTEM SERIAL NUMBER
DETAIL BY SYSTEM SERIAL NUMBER, EQUIPMENT TYPE
DETAIL BY REGION, LOCATION, FACILITY TYPE/IDENT
DETAIL BY REGION, SECTOR, FACILITY TYPE/IDENT
DETAIL BY CONTRACTOR, CONTRACT NUMBER
SUMMARY BY REPORT DATE EQUIPMENT TYPE, SYSTEM SERIAL
NUMBER
SUMMARY BY LOCATION, FACILITY TYPE
SUMMARY BY SYSTEM SIZE, EQUIPMENT TYPE, SYSTEM SERIAL
NUMBER

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FSEP PRECOMMISSIONED FACILITY REPORTS:

PRECOMMISSIONED FACILITY LISTING BY FAC TYPE/IDENT, REGION

FSEP CHANGE REVIEW REPORTS:

FSEP FACILITY/SERVICE FILE
FSEP FACILITY SUPPLEMENT FILE
FSEP EQUIPMENT DETAIL FILE
FSEP MODULE DETAIL FILE
FSEP POWER SYSTEM FILE
FSEP PRECOMMISSIONED FACILITY FILE